June 14 #24

THE MARINE REVIEW

...ft.; mean draught, 9 ft. 6 in. The hull and deck house are constructed of open-hearth tested steel, and the hull heavily plated for encountering ice. The fore foot or lower portion of stem is sheared away gracefully to enable the boat to get up onto and ride over the ice freely. The framing is also very heavy, being fitted with reverse frames and spaced double from the stem aft to bluff of bow. The boat is very conveniently arranged, having a good sized forecastle forward and a roomy workshop for engineers abaft the engine room. The pilot house is much higher than on the other boats and is large enough to shelter about thirty people. There is a shower bath with hot and cold water in the after end of the deck house, just forward of hose room. The boat carries 5,000 ft. of hose in the hose room and in forecastle. She is fitted with the Williamson Bros. steam and hand combined steerer and the American Ship Windlass Co.'s hand pump brake windlass. The forward turret on top of pilot house throws a 3½ in. stream over 500 ft., and there are fourteen gate valves on front of pilot house for fourteen leads of 3½ in. hose. A feature that is new on fire boats is the telescopic water tower, which, when raised to 45 ft. above top of deck house,

...generator ...Electric Co.'s make; one 6 pole, 7 K. W., 110 volt direct current generator, direct coupled to a 5 x 4½ in. single cylinder vertical engine, operating a 550 r. p. m., at a steam pressure of 80 lbs. The fixtures for lights are all cast brass of a substantial and neat design, no spun brass being used.

There are six Milwaukee patent brass nozzles with 2-in. deliveries, which are portable and can be placed on rail, or in any part of the boat. These nozzles can be directed on the fire and left in any position after being directed on the flames and are a new feature on fire boats, having been made by the Loeffholz Brass Works of Milwaukee, under the direction of Mr. Thomas Manion, superintendent of machinery of Milwaukee fire department.

The propelling engines are a pair of overhead direct acting screw engines, with cylinders 18 in. in diameter by 20 in. stroke, with double bar link motions and flat slide valves balanced, and without condenser. Exhaust steam passes through a feed water coil heater. Engine works with 140 lbs. per square inch boiler pressure, up to 175 revolutions per minute, with a propeller 8 ft. in diameter and 10 ft. pitch, designed extra heavy for work in ice and with due efficiency for backing.

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The boiler is of the Scotch marine type, 12 ft. diameter by 15 ft. long, built by the Manitowoc Boiler Works for 140 lbs. pressure. The two steam fire pumps are of the vertical duplex type, direct acting, each with two steam cylinders and two water cylinders. All double acting and connected with suitable cranks, connecting rods, fly wheels, cross heads, girders and connecting rods used in place of yokes or eccentric rods. The columns are of wrought steel, polished.

[redacted]

On a preliminary trial run made [redacted] Michigan on May 11, the boat made 12 miles per hour and proved herself a very easy steamer. In maneuvering with the steam steerer she turns completely around in about twice her length. Chief Engineer Thomas A. Clancy of the Milwaukee fire department is to be congratulated, as with this addition to the Milwaukee fleet of fire boats it makes the Cream City water front the best protected of any port on the chain of lakes.

SALVING THE MATAAFA.

Duluth, June 4.—The steamship Mataafa of the Pittsburg fleet, wrecked at the harbor entrance of Duluth in November last, was finally got into the harbor on Sunday. The rescue was a decided credit to Capt. Reid, for most who knew of the conditions did not believe the ship could be salved at all. He has been at work on her since spring opened, and up to the past few days has never had a long enough period free from northwest gales to get her pumped out and kept so long enough to move inside. He has had two or three attendant tugs and steam vessels around her all the time, and has pumped an enormous volume of water, which has run in nearly as fast as it went out, and whenever there was a slight northeast breeze filled her up again, so low was the freeboard. Capt. Reid is to get $25,000 for this job, when the ship is delivered at the ship yard, and he will now jettison the ore left in the hull. The ship has been held together by braces at the brakes and stood the floating into the harbor well. Two pumps were necessary to keep her afloat.

Capt. Reid will now tackle the Edenborn, a larger and [redacted] the bow is hard and fast.

IMPROVEMENTS AT LORAIN.

The extensive improvements being made to the lake terminals of the Baltimore & Ohio railroad, at Lorain, Ohio, will be completed within several weeks. This greatly enlarges the facilities necessitated by the volume of business. All the improvements are of most modern design, and Mr. P. Farwell, of Cincinnati, is the contractor. These improvements include a ten-stall brick round house; machine shop; blacksmith shop and boiler room; oil and store house, 30 by 50 feet; gravity coal tipple and sand house, the coal tipple having a capacity for 360 tons and the sand house being able to take care of 16 cars of wet sand and 37 tons of dry sand; double track, storage ash pit, 86 ft. long. This pit so arranged as to store two days' supply of ashes, which can be removed by a locomotive crane and automatic grab bucket and loaded in cars either ahead of or behind the crane; trainmen's building, 35 by 50 ft., arranged with offices for the gen-

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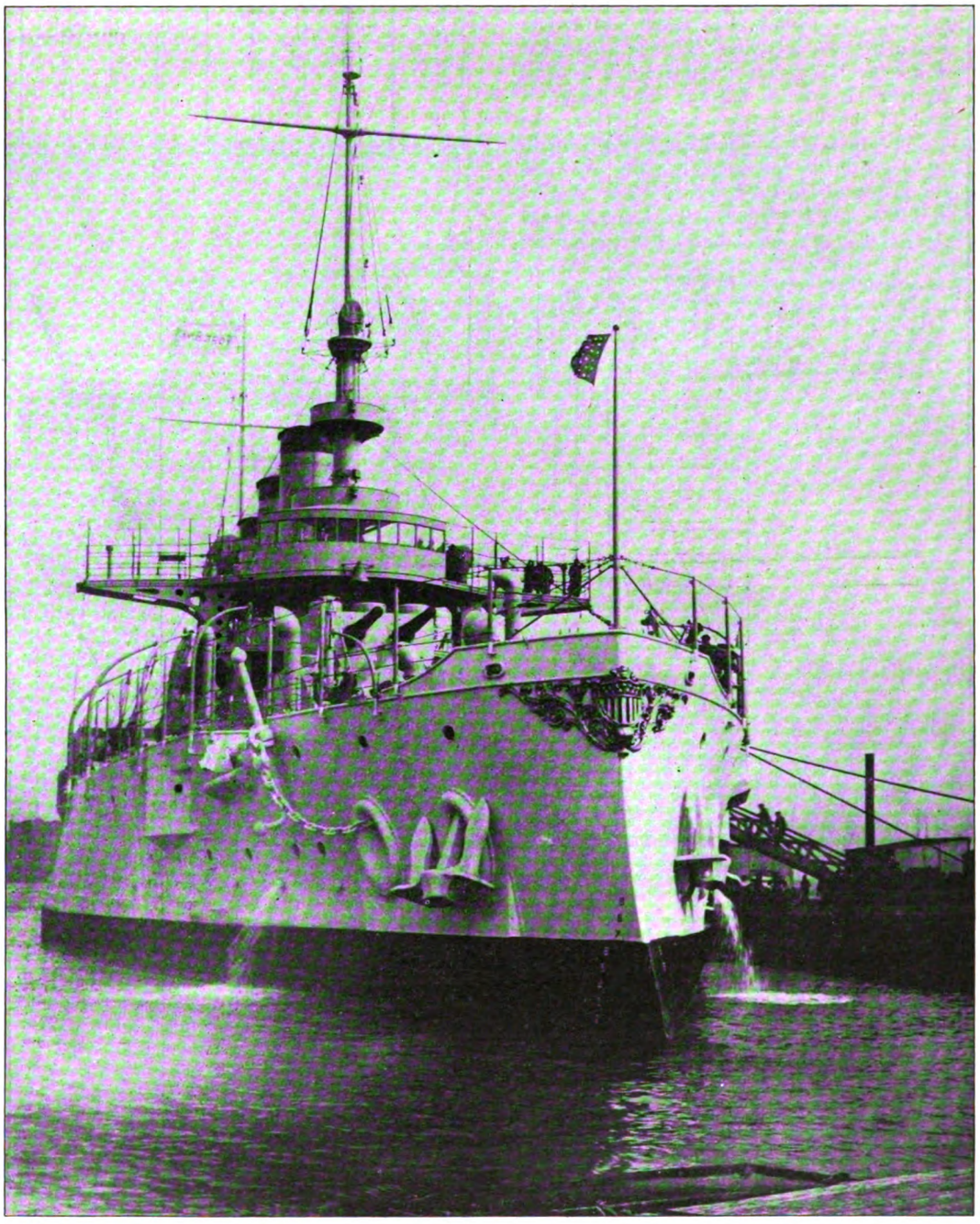
eral foreman and clerks; and toilet rooms on the first floor for the workmen, enginemen and trainmen. On the second floor are located reading, lounging and sleeping rooms for the enginemen and trainmen. There is also a kitchen and lunch room in the basement.

The Baltimore & Ohio railroad is also making big improvements at its ore docks at Lorain. This consists of the alteration of ten ore hoist machines to operate automatic buckets. Heretofore these machines have used the old fashioned shovel buckets which had to be loaded in the hold of the ore vessel by hand shoveling, involving a large amount of hard manual labor and much greater expense. With the new arrangement, the bucket is self-loading and very little labor is required. These machines are also being equipped with a thoroughly modern scraping device by which the ore under the decks of the vessel is scraped by electric power under the hatchways, where it can be reached by the automatic bucket. These scraping devices are operated with electricity brought from the old shop's power house, which has been recently remodeled and enlarged. The electricity is transformed from alternating to direct current in a transformer house built close to the dock. This work will cost about $100,000. The McMyler Manufacturing Co. has the contract for the ore machines and the work is very nearly completed. It is expected to put them in operation early in June. The scraping devices are being furnished by Mr. M. Andrews, of Cleveland.

At Fairport a new bridge is being built over the Black River so as to admit of running heavy locomotives down



THE BATTLESHIP NEW JERSEY TAKEN ON MAY 12, THE DAY OF HER DELIVERY TO THE BOSTON NAVY YARD.
Built by the Fore River Ship Building Co., Quincy, Mass.

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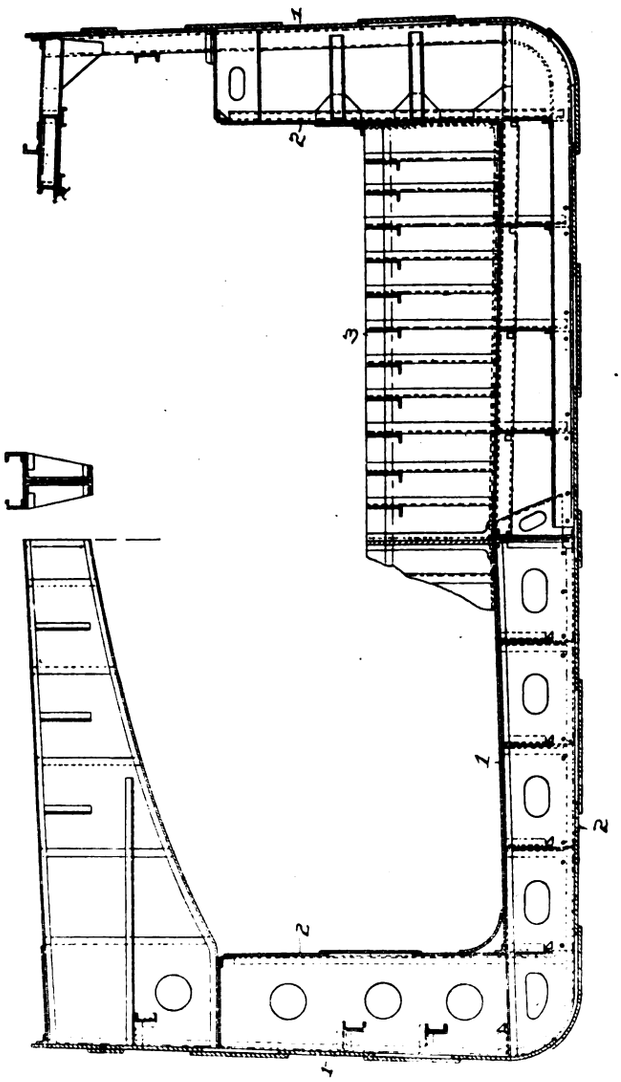
to the docks at Fairport. These engines are now cut off at Painesville and the trains handled to and from the docks with lighter engines. The company is also making improvements in its trackage at the Fairport coal docks. A new car dumper is being built by the Pittsburg Coal Co., for loading coal in its vessels. This car dumper is furnished by the McMyler Manufacturing Co.

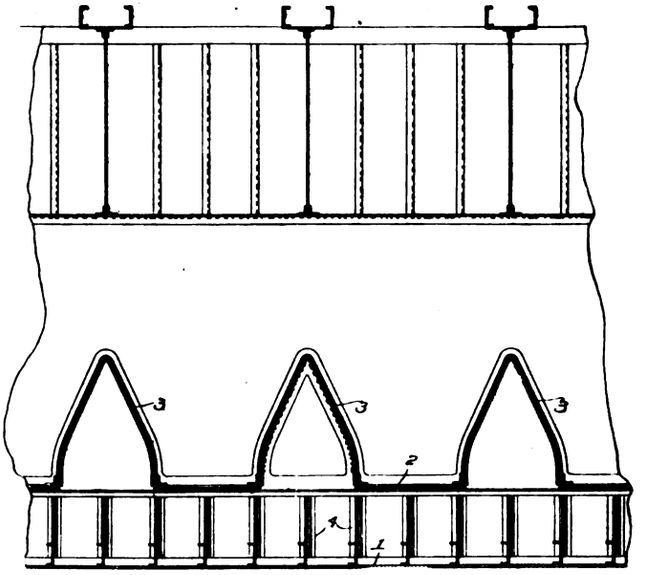
CAPT. KIDD'S DESIGN OF BULK FREIGHTER.

Capt. Joseph Kidd, of Duluth, has taken out letters patent on a design of bulk freighter differing somewhat from any now on the lakes, but resembling in general features the steamer Hoover & Mason. The design is clearly expressed in the illustrations accompanying the present article. The inverted V-shaped affairs shown in the illustrations are hollow partitions running athwartship, forming a series of hoppers spaced 12-ft. centers into which the coal or ore is loaded. The feature aimed at in this design is the total unloading of the cargo by



MIDSHIP SECTION OF CAPT. KIDD'S PROPOSED SHIP.

automatic machinery. Ordinarily the clam shells are effective in unloading automatically until the bottom of the cargo is reached when men have to be sent down into the hold to gather the ore together and later to actually shovel it into the clam shells. Capt. Kidd's purpose is to so design a hopper that as the clam shells take out ore directly in the middle of it the remaining ore, by force of gravity, continues to pile into the middle of the hopper and become available to the jaws of the clam shell. The substantial difference in this design and that of the Hoover & Mason lies in this: In the steamer Hoover & Mason the sides of the hoppers slope clear to the bottom; in the new design there is a perpendicular drop. In the drawing this drop is given as 24 in. but Capt Kidd prefers that the



DESIGN OF TRANSVERSE HOPPER IN CAPT. KIDD'S PROPOSED SHIP.

perpendicular part shall be one-half the total height and so states in his patent. It was reported last year that ore clung to the sloping sides of the Hoover & Mason's hoppers, but Mr. Tomlinson says that no such difficulty was experienced. Capt. Kidd has received the following letter from one of the superintendents of Lake Erie docks:

"I have looked over the plans very carefully and am satisfied that in so far as the unloading goes a boat of this type would be an entire success. This type of construction simplifies unloading machinery and increases the efficiency of unloading machinery for the reason that it can work to its maximum capacity until the boat is almost entirely cleaned up. The shape of the peaks as you show them I think is very good. In fact, in criticizing the Hoover & Mason I suggested the shape such as you show them, so that I think you have adopted very good lines. Care should be taken regarding the ore in the wings. The bilges should be either sloped or boxed in so that there will be no difficulty in taking the ore out of the wings with the grab buckets. From an unloading standpoint I am very sure this boat will be an entire success."

Of course, there is no doubt that Capt. Kidd's design lends an athwartship strength that the ordinary carrier does not possess. The partitions are built in, solidly riveted to the hull, and form a rigid permanent portion thereof. Capt. Kidd in his specification says that the bottom is so strengthened by the partitions that all the cargo might be piled in the middle of the hold without causing the vessel to sag.

The fourth and last section of the 600-ft. steel dry dock has been launched at the Ecorse yard of the Great Lakes Engineering Works. This dock is capable of accommodating any vessel at present on the lakes, or likely to be built for several years. The dock is so constructed that it can be uncoupled at will and made into two or more docks. It is being used this week as two docks with the car ferry, Saint Ignace, in one 300-ft. section and the steamer A. L. Hopkins in the other.

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STEAMER HOOVER & MASON.

Some unusually good photographs are published herewith showing the construction of the freight steamer Hoover & Mason, designed by the Chicago firm of consulting engineers, for whom the vessel is named, and built by the Great Lakes Engineering Works, Detroit, for the Zenith Steamship Co., of Duluth. The photographs show quite clearly how radical is the departure from the ordinary type of vessel. The great purpose in designing the vessel thus, was, of course, to facilitate unloading, but there are other considerations as well. For instance, this steamer is much stronger athwartship than any steamer of similar dimensions on the lakes, due to the fact that the weight of the cargo is transferred through transverse hopper sides directly to the shell of the vessel. There is, therefore, not so great a tendency for the bottom to sag as in vessels of ordinary form. The type is, however, from the builder's standpoint, more expensive to construct than the ordinary ore carrier, which may explain the fact that no additional orders have been given to the ship yards for vessels of the Hoover & Mason type.

Mr. Tomlinson, however, expresses himself as being very well satisfied. Its great advantage lies in the fact that the entire cargo is accessible immediately under the hatches to the grab buckets. Floor space to be cleaned up, is also a minimum, as the cargo is trimmed into spaces 6 ft. 9 in. wide so that the clams are enabled to clean out the vessel entirely. Some fear was expressed by vessel owners when this freighter was first projected, that the ore would cling to the sides of the transverse hopper and would have to be scraped by hand, but Mr. Tomlinson says that this difficulty has not been met with. However the athwartship slope of the hopper has now been supplemented by a side slope as well. As originally built the hopper had straight sides fore and aft. The steamer has been unloaded with considerable dispatch, though she has not established a record for unloading, and figures for performance in this regard are not at hand. However, she is an excellent carrier for, while rated as a 9,000 ton ship, she has carried 9,841 tons. The labor cost of unloading this cargo was $70, or about seven mills per ton, which is said to be the lowest unloading cost yet attained. Recently, however, she unloaded 321,000 bushels of grain at the Mutual Elevator in Buffalo between the hours of 7.10 a. m. and 9.45 p. m., with stoppages for two meals, probably two hours.

This type of construction has permitted a return to the standard of 24-ft. hatch, of which there are sixteen in this steamer as against thirty-two in the ordinary 12-ft. center boats. The arch construction of deck support has been replaced by deck beams. The steamer is 524 ft. over all, 50-ft. keel, 54-ft. beam, and 7 ft. deep. Her engines are quadruple expansion 18, 27, 40, 62-in. cylinder diameters, by 42-in. stroke, supplied with steam from two Niclausse boilers 9 x 3 ft., allowed 250 lbs. pressure. With the exception of one other, the Hoover & Mason is the only boat having Niclausse boilers.

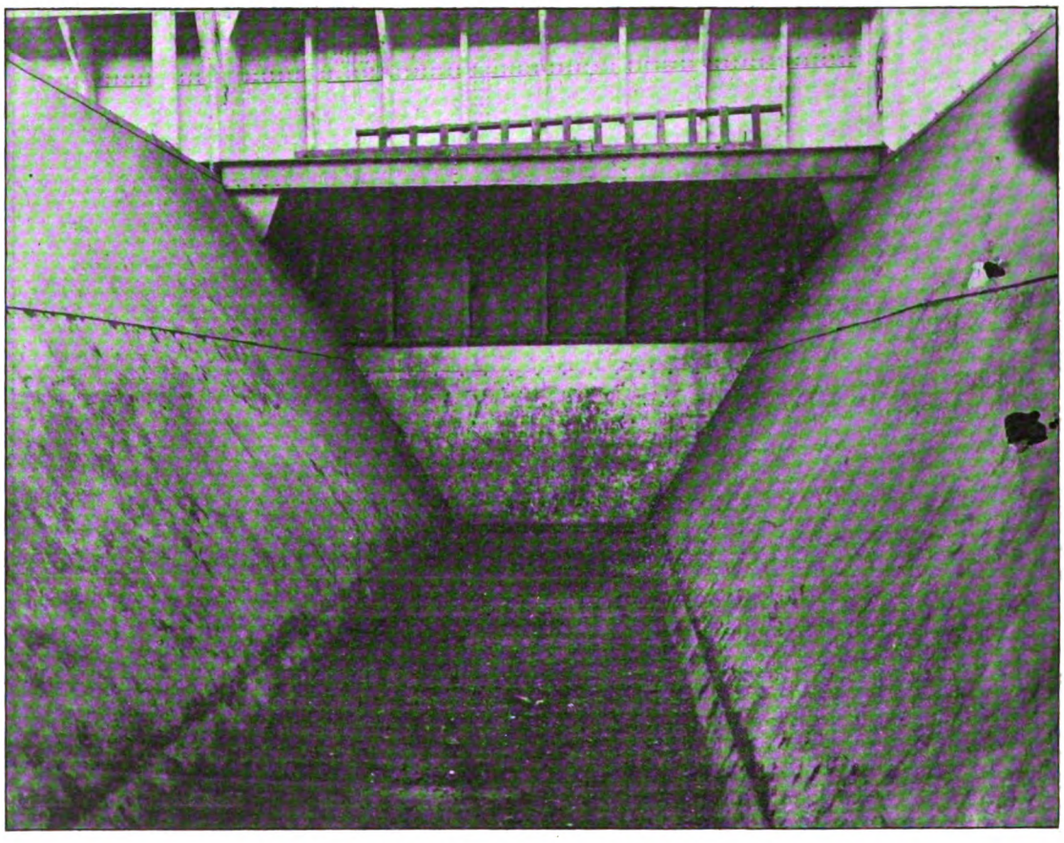

FIG. 1.—SHOWING ONE OF THE TRANSVERSE HOPPERS EMPTY.

The photographs catalogued herewith, tell their own story. Fig. 1, shows one of the transverse hoppers empty, Fig. 2, shows one hopper fully loaded and the others partly loaded. It will be observed that the fully loaded one has its cargo cone-shaped. One of the points, as stated, made against the practicability of the transverse hopper construction was, that the ore would adhere to the plates forming the incline sides, and at the removal of this ore would necessitate the employment of shovelers. In loading, however, the spout of the chute is directed to discharge, not against the sides of the hopper, but over its center. It naturally forms a conical pile, the larger pieces of ore fall by gravity to the outside circumference of the cone and resting against the hopper sides, while

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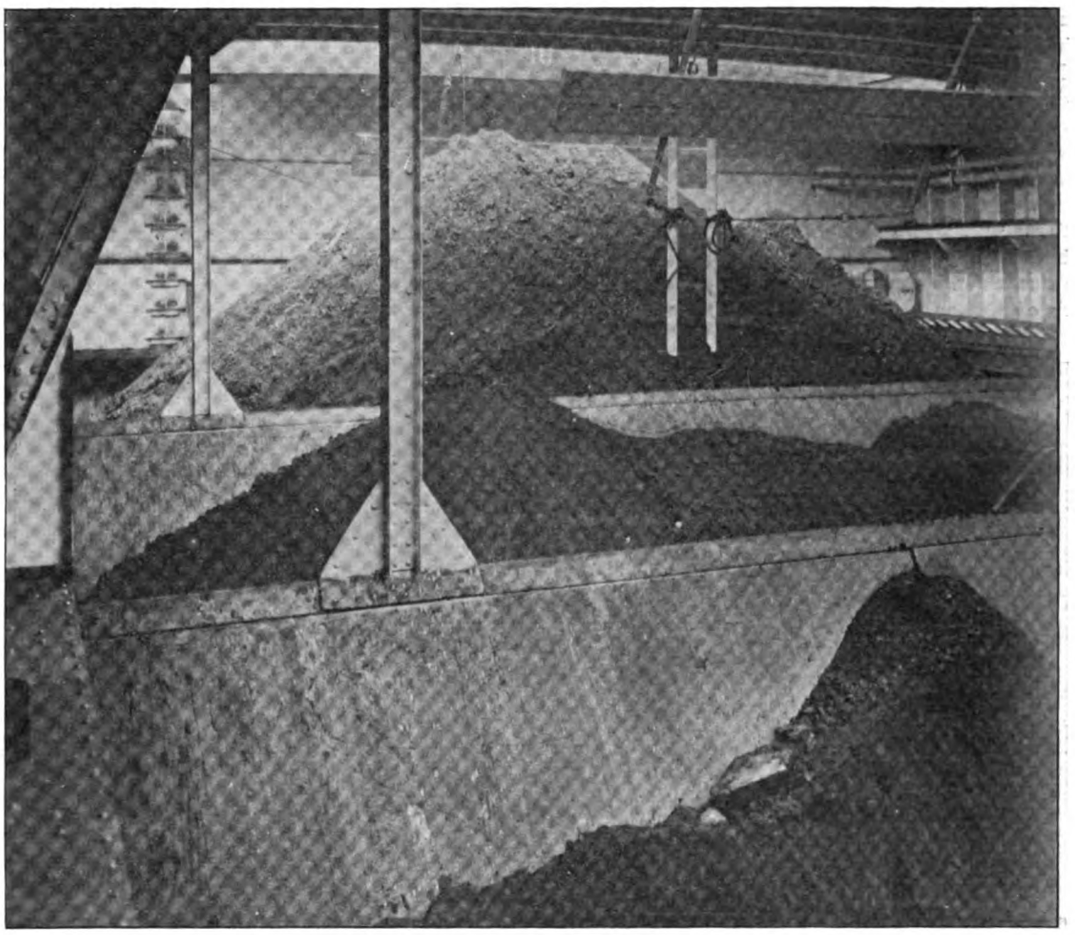

FIG. 2.—SHOWING ONE HOPPER FULLY LOADED AND THE OTHERS PARTLY LOADED.

the fine ore settles in the center. As the ore is unloaded, the lumps slide down the incline sides, carrying the fine ore with them. The width of the flat portion of the hopper bottom is governed by the size of the largest grabs at lower lake unloading ports, and as the ore is naturally trimmed in loading to the center of each hopper, it is almost wholly accessible to the grab. Fig. 3, shows one of the grabs in process of loading, and shows clearly also, how complete its command is of the entire cargo in the hopper. Fig. 4, is a general view of the cargo hold of the vessel as seen from the top of the transverse hopper. Fig. 5, shows the vessel under the Hoover & Mason rigs at South Chicago.

Supt. R. R. Richardson of the Pittsburg & Conneaut Dock Co. has prepared the following table comparing the discharging records of the steamer Hoover & Mason with two other steamers of modern design, the Moses Taylor and the Socapa. The Taylor is a modern steamer with hatches spaced 24-ft. centers. The Socapa has her hatches spaced 12-ft. centers. In unloading the Taylor the Andrews electric winches operating road scrapers were used. Both the Hoover & Mason and the Socapa were unloaded without any auxiliary scraping devices and were cleaned up with the assistance of but few laborers. The significant part of the comparison is the tons per hour per machine as given in the last column showing a distinct advantage in favor of the Hoover & Mason. The comparison must be regarded as a fair one, as the three vessels were unloaded under normal conditions of trade by the same machinery and the same operators.

Summing it up briefly, the owners have in the Hoover & Mason a somewhat stronger ship than the ordinary form of construction, with a weight of hull fully as low per ton of freight carried as in any form of construction;

Steamer	Tons	Machines	Mach. Hrs.	Tons per Hr.
Moses Taylor	6622	4 Brown Electric 5-ton	29 hr. 21 min.	225
Socapa	9347	" " " "	41 " 32 "	225
Hoover & Mason	8810	" " " "	37 " 03 "	238

a self-trimming cargo, capable of being practically unloaded without hand labor; capable of carrying also, a variety of ores, if required, on a single trip; capable as shown in the above table of extreme rapidity of discharge; but probably a little more expensive ship from the ship builder's standpoint.

The steamer John Duncan seems to have more than her share of ill luck this year. She was struck by the steamer Wisconsin at Amherstburg on May 23 and sank at Bois Blanc island. She was subsequently released and got under way only to come into collision last week with the Anchor liner Lehigh. The two steamers collided in a heavy fog off Cathead Point at the entrance of Green Traverse Bay. The Duncan managed to struggle into port, where she sank in 26 ft. of water, but settled later in deeper water.

Mr. E. M. Saunders, president of the Northwestern Fuel Co., in an interview at Duluth, recalls that he shipped the first cargo of coal in 1871. It consisted of 450 tons, and it took two days to unload it by means of hoists operated by horses. Some interesting comparisons may now be drawn from this.

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FIG. 3.—SHOWING THE AUTOMATIC BUCKET FILLING ITSELF IN ONE OF THE HOPPERS.

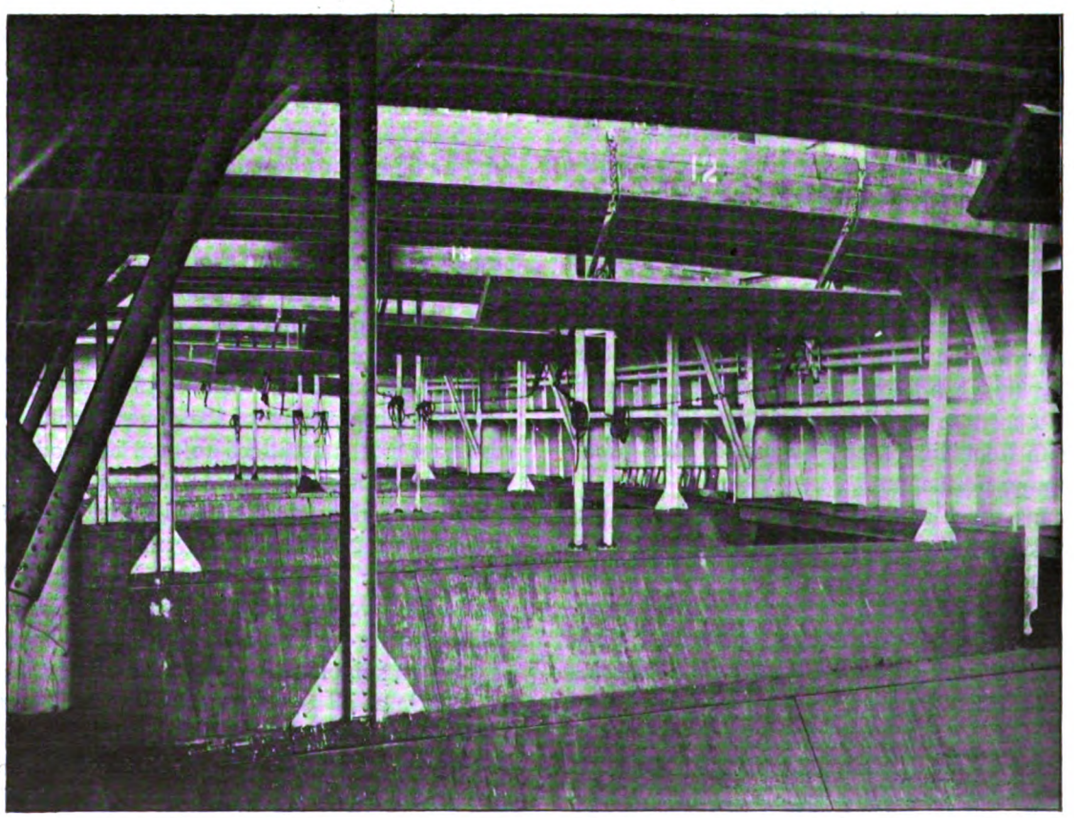

FIG. 4.—SHOWING THE HOLD OF THE HOOVER & MASON TAKEN FROM THE TOP OF THE HOPPERS.

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THE MARINE REVIEW

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JUNE 14, 1906.

A TALK WITH REPUBLICANS.

The MARINE REVIEW is in no sense a partisan newspaper, except to the extent that it desires the advancement of the maritime interests of the United States. Those interests are advancing in all domestic lines, and nothing more could be asked at the hands of the government than they now receive. But in the foreign trade our shipping is languishing and is unprofitable. Promises have, time after time, been made by each of the great political parties that they will remedy this condition. Just now the Republicans are in a position to redeem their promises. Hence this talk with Republicans, and because of their promises and non-performances.

Republicans must admit that our shipping in the foreign trade was largest in 1861. Today it is but one-third what it then was. Then the value of our foreign trade was less than six hundred millions annually, now its value is about three billions. So the decline is not for lack of something to carry. During all of these years of the decline of our foreign-going merchant marine Republicans have controlled the law-making power of the government, except during the brief periods of partial Democratic control.

Democrats withdrew subsidies to our steamships in 1858, which had been paid by the national government since 1848. That left our ships in the foreign trade in free trade competition with foreign ships. That, acce'erated by the Civil War, caused the decline in our foreign-going shipping. It cannot prosper under free trade conditions of competition, because ours is a highly protective nation. Our ships must be protected in order that they may increase and prosper. The Republican policy of protection has been extended to the product of every other American industry that is subject to foreign competition, except our ships. Our other great industries have prospered, under protection. Our tin plate is the latest notable example. In 1890 we manufactured little or no tin plate in this country. It was unprotected. The McKinley tariff gave it generous protection. We now annually manufacture more than a thousand million pounds of tin plate and export more than we manufactured in 1890.

In 1896 the Republican national platform declared in favor of protection for our shipping through the tariff—the same instrumentality through which our other national industries are protected against foreign competition. The Republican candidate for the presidency (William McKinley) unqualifiedly indorsed that plan of legislation. Subsequently he and the leaders of his party agreed that the tariff could not be invoked for the protection of our deep-sea shipping, since it would necessitate the abrogation of some thirty odd treaties, with as many different countries, a task regarded as too stupendous, and as fraught with possibilities of reprisal of a character likely to cause more harm than good.

That left only subsidies and bounties available as a protective measure of legislative relief. It is the method by which other nations protect their shipping. In 1900 and in 1904 Republicans renewed their national platform pledges in behalf of an American deep-sea shipping. Meanwhile, Republicans had prepared, and were pressing upon the attention of their colleagues in congress, subsidy and bounty bills for the upbuilding of our deep-sea shipping. No other plan was seriously urged by Republicans. Republicans since 1896 have controlled the law-making branches of the government. If Republicans are not committeed to, and in good faith bound to enact, subsidy legislation for our shipping growth, what method or plan of legislative relief have they proposed? None. Either, then, their pledges are insincere, or the subsidy legislation their leaders in congress have endeavored to pass explains the method of legislative relief they do propose. The friends of American shipping, the advocates of a legislative remedy, have at all times been willing to accept the bills prepared by Republicans, and have worked hard for the passage of the bills Republicans have framed.

In his annual message to congress, in December, 1903, President Roosevelt urged the appointment of a commission to investigate the report regarding what

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should be done for American deep-sea shipping. Such commission, composed of five senators and five representatives—six of them Republicans and four Democrats—was appointed early in 1904, and in January, 1905, filed its report, embracing suggestions received and information elicited at many public hearings held in the leading sea, lake and gulf ports of the United States, all in three volumes containing upwards of 2,000 pages. The commission also framed a bill to carry into effect its recommendations. This bill was introduced in the senate by Senator Gallinger, chairman of the commission, and in the house by Gen. Grosvenor, a member of the commission, and the chairman of the house Merchant Marine and Fisheries Committee. Gen. Grosvenor is a leading Republican member of the house, and Senator Gallinger is one of the leading Republicans of the senate.

The commission's merchant marine bill passed the United States senate on February 14, 1906, after many weeks of full discussion and debate. It was passed by Republicans. No Democrat voted for the bill. Every Republican senator who has for years been working for an American deep-sea shipping, who has been prominent in promising such legislation, voted for that bill. They regarded it as a measure that would fulfill and redeem Republican promises. Let it be remembered that no Republican has introduced in the present congress any other bill for the upbuilding of our shipping in the foreign trade than that prepared by the Merchant Marine Commission and introduced in each branch of congress by Republicans.

This bill has been in the house Merchant Marine and Fisheries Committee since the beginning of the present session of congress. Public hearings have been held by that committee, and a 500-page volume of additional argument for its passage has been added to the great piles of literature, official and unofficial, that have been accumulated in favor of this legislation. But the committee, on which there are twelve Republicans and but six Democrats, one of the latter known to favor the bill, does not report it. The question presses for answer—Why is it not reported? This same committee favorably reported this same bill at the last session of the last congress. There are but two Republicans now on that committee who were not on it at the last session of the last congress. Why, then, does that committee hesitate to do now what it did fifteen months ago? The speaker? But, if it be alleged that the speaker holds the bill back, why did he not hold it back fifteen months ago? Why did he permit it to be reported then? It is up to Republicans to answer these questions. It is up to the Republican members of the house of representatives to answer them, and especially it is up to the Republican members of the house Merchant Marine and Fisheries Committee to answer them.

This bill is accepted as the best obtainable by the known friends of American shipping. They have worked for it industriously. They have accepted, in good faith, this measure as the method by which Republicans purpose redeeming their many pledges in behalf of American shipping. The Republican press of the country, with very few exceptions, favor this bill, and they look upon it as a Republican measure. Great national, state and local commercial, industrial, financial and labor organizations, embracing in their membership tens of thousands of intelligent and influential men, have petitioned congress for the passage of this particular bill. It is realized that it is this bill, or nothing. No Republican, at this late stage, after all of these years of promise by Republicans, in the light of the action of this congressional commission, in view of the senate's indorsement by Republican votes, and with knowledge of President Roosevelt's approval of this particular bill, can now fairly defend the advocacy of a different—of an unobtainable—proposition.

Not only have Republicans framed this measure, not only have Republicans passed it through the senate, but President Roosevelt has publicly declared that he admires and fully approves of this bill. He says he has studied it; he regards it, he says, as an admirably and most skillfully drawn bill. The president is eager to do all in his power to have it enacted. President Roosevelt, while president of the whole country, is, nevertheless, a Republican—a most influential Republican. He looks upon this bill as a measure eminently praiseworthy and desirable in itself, as designed to effect the redemption and fulfillment of Republican pledges in behalf of an American merchant marine.

Again the question arises, naturally, pertinently—are Republicans acting in good or in bad faith? They have a majority of six on the house Merchant Marine and Fisheries Committee. They have a majority of 112 in the house of representatives. They have before them but one bill offered by Republicans for the upbuilding of our foreign-going shipping—a bill passed by Republican votes in the United States senate, and approved of by President Roosevelt, a Republican.

Republicans, what about it?

SHIP BUILDING DURING MAY.

The bureau of navigation reports 149 sail and steam vessels of 49,137 gross tons were built in the United States and officially numbered during the month of May, 1906, as follows:

	WOOD				STEEL				TOTAL	
	Sail		Steam		Sail		Steam			
	No.	Gross	No.	Gross	No.	Gross	No.	Gross	No.	Gross
Atlantic and Gulf	16	2,349	60	1,549	3	903	6	8,282	85	13,083
Porto Rico	...	.....	...	.....	...	.....	...	.....	...	.....
Pacific	1	11	24	2,283	...	.....	...	.....	25	2,294
Hawaii	..	.....	..	.....	..	.....	..	.....	..	.....
Great Lakes	..	....	17	313	...	.....	...	33,050	25	33,363
Western Rivers	..	.....	14	397	...	.....	8	.....	14	397
Total	17	2,360	115	4,542	3	903	14	41,332	149	49,137

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printed in the newspapers that the American Ship Building Co. is to surrender its New Jersey charter and to secure an Ohio charter. Nor is there any truth in the report that the preferred stock is to be retired in order to make the issue all of one kind. Neither of these subjects has been discussed by the directors and surprise is expressed that they should be given such currency. All talk also concerning a continuance or an increase in common stock dividends is premature. The financial statement of the company will not be given to the public until the annual meeting in October.

The senate has passed the omnibus lighthouse bill which went through the house on May 21, and it now goes to the president for approval. Appropriations to aid navigation along the great lakes follow: A light and fog signal on the south end of the breakwater, harbor of refuge Milwaukee, $100,000; a light keeper's dwelling at Menominee, $5,000; a light keeper's dwelling at Sheboygan, $6,000; a dwelling for keepers of lighthouse on Horse Shoe reef, Buffalo harbor, $3,200; for four range lights, Strawberry island cut and channel leading thereto, Niagara river, $13,000; two range lights Isle Aux Pecles, Lake St. Clair, $19,000; a light vessel to be placed off Martin's reef, northwest end of Lake Huron, $45,000; a light and fog signal on Rock of Ages, Lake Superior, $100,000, in addition to $25,000 heretofore appropriated; establishing the Superior entry pier headlight on south pier, Duluth Harbor, $28,000.

STEAMSHIP BONDS.

The Cleveland Cliffs Iron Co. has sent out a circular to its stockholders inviting them to subscribe for a block of $1,110,000 5-per cent bonds secured on the three big ore carriers that it is to bring out during the present season, and which are now under construction at the Ecorse yard [illegible]

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AROUND THE GREAT LAKES

The new Hawgood steamer, Henry B. Smith, left Lorain on her first trip last Thursday. She carried coal to Duluth.

The new package freight steamer Ogdensburg, of the Rut-

The steamer Rochester, of the Union Steamboat Co.'s fleet, has been sold to the Michigan Salt Co., and will be rebuilt for the salt trade. The Rochester went ashore last fall near Escanaba and is in need of considerable repairs.

The steamer Henry H. Rogers, building for the Pittsburg Steamship Co., at the South Chicago yard of the American Ship Building Co., will be launched on Saturday next, and will be christened by Miss Marion H. Rogers of Chicago, a niece to Mr. Rogers.

The wrecking of the steamer City of Concord, which sank at Ellsworth slip at Cleveland, is under way. A cofferdam is now being built about the boat.

The steamer James C. Davidson, which stranded above the head of Belle Isle Park last week, was released without much effort by the lighter Newman.

The Manitowoc Dry Dock Co., Manitowoc, Wis., launched a steel suction dredge for the Lincoln Park commissioners, of Chicago, on June 9.

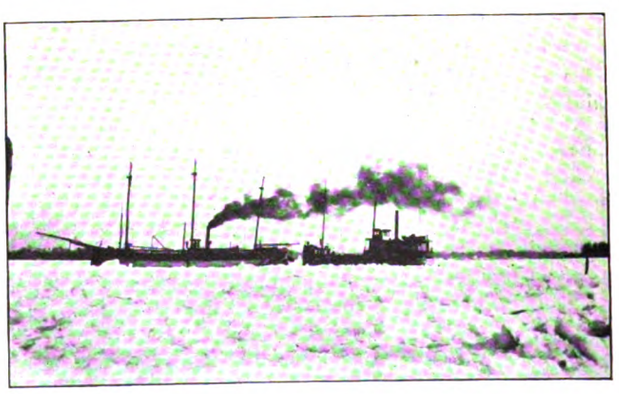
It is announced that the Pennsylvania railroad officials will improve the P. & E. docks at Erie instead of abandoning them as was recently reported. Plans have not as yet been developed.

First-class tickets, issued by foreign lines and which are good for transportation over the Nickel Plate road between Cleveland and Buffalo, will be accepted for passage on the Cleveland & Buffalo Transit Co.'s steamers.

The schooner Three Brothers was dismantled between West and East Sister Islands on Lake Erie last week. The State of Ohio sighted the wreck and the tug Colton was sent to tow the vessel to Lorain.

While going up the river the steamer Hoover & Mason struck the Minnesota draw of the Northern Pacific bridge at Superior, putting it out of commission for a few days. The steamer was not seriously damaged.

says that the boat can carry 1,500,000 ft. of dry lumber, and he expects to load several cargoes of that size before the end of the year.



The McMowan Wrecking Co.'s outfit that broke from moorings at Port Huron and was carried down the river by the ice. They are just passing Algonac with all anchors down, steamer working strong but still going down stream with the ice.

The Great Lakes Dredge Co., of Port Arthur, has five dredges at work on government improvements in the harbor at Fort William and the contract, which is on the continuous plan, is the largest individual dredging job on the lakes, involving the removal of about 15,000,000 cubic yards.

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The $16,000 libel case filed by the Gilchrist Transportation Co. against the steamer Bethlehem, of the Lehigh Valley Transportation Co., in the United States court at Detroit, has been settled out of court. The Bethlehem last summer sheered into the Gilchrist steamer Saturn in St. Clair river near Parson's dry dock.

The steamer Bulgaria, which stranded on Fishermen's Shoal, will be abandoned by the underwriters as a constructive total loss. Capt. Cyrus H. Sinclair who went to the wrecked steamer on behalf of the owners wired that her decks are forced up, her forefoot gone and her bottom badly damaged. The Bulgaria was built in 1887 and was 280 ft. long and 39 ft. beam. She was bound for Green Bay with coal when she stranded.

The St. Lawrence River Power Co. has just purchased the tug Monitor, of Chicago, from the Great Lakes Towing Co. This tug was originally built in 1862 but was rebuilt during the present year. She is 70 ft. long and 15 ft. beam and 37 gross tons. The St. Lawrence River Power Co. has also purchased the new ten-yard dipper dredge Industry which was built during the past season by the Duluth-Superior Dredging Co., of Duluth, the machinery for which was furnished by the Bucyrus Co. This dredge will probably be renamed.

The wrecking of the steamer Crescent City, which was released last week, was under the general direction of Capt. W. W. Smith, marine superintendent of the Pittsburg Steamship Co. He was assisted by Mr. W. J. Greiner, assistant shore engineer, and W. F. Brown, who was mate of the steamer Mataafa last year. They began wrecking operations on April 10 and did most creditable work. The steamer Edenborn, ashore at Split Rock, now remains the only stranded vessel belonging to the Pittsburg Steamship Co. that has not been released. Capt. James Reid has the contract to release her and will shortly begin operations.

The Hamilton Steamship Co., Hamilton, Ont., has been acquired by the same interests that control the Niagara, St. Catherines & Toronto railway, operating the Lakeside and Garden City between St. Catherines and Toronto. These interests are practically identical with the Canadian Ship Building Co. and a number of other enterprises of which the organizing head is Mr. F. Nicholls. The Hamilton Steamship Co. has been negotiating for the purchase or the construction of a new steamer. If an order is placed it will certainly be with the Canadian Ship Building Co.

There is absolutely no foundation for the reports widely printed in the newspapers that the American Ship Building Co. is to surrender its New Jersey charter and to secure an Ohio charter. Nor is there any truth in the report that the preferred stock is to be retired in order to make the issue all of one kind. Neither of these subjects has been discussed by the directors and surprise is expressed that they should be given such currency. All talk also concerning a continuance or an increase in common stock dividends is premature. The financial statement of the company will not be given to the public until the annual meeting in October.

The senate has passed the omnibus lighthouse bill which went through the house on May 21, and it now goes to the president for approval. Appropriations to aid navigation along the great lakes follow: A light and fog signal on the south end of the breakwater, harbor of refuge Milwaukee, $100,000; a light keeper's dwelling at Menominee, $5,000; a light keeper's dwelling at Sheboygan, $6,000; a dwelling for keepers of lighthouse on Horse Shoe reef, Buffalo harbor, $3,200; for four range lights, Strawberry island cut and channel leading thereto, Niagara river, $13,000; two range lights Isle Aux Pecles, Lake St. Clair, $19,000; a light vessel to be placed off Martin's reef, northwest end of Lake Huron, $45,000; a light and fog signal on Rock of Ages, Lake Superior, $100,000, in addition to $25,000 heretofore appropriated; establishing the Superior entry pier headlight on south pier, Duluth Harbor, $28,000.

STEAMSHIP BONDS.

The Cleveland Cliffs Iron Co. has sent out a circular to its stockholders inviting them to subscribe for a block of $1,110,000 5-per cent bonds secured on the three big ore carriers that it is to bring out during the present season, and which are now under construction at the Ecorse yard of the Great Lakes Engineering Works. Contrary to the usual custom, these steamers are bonded for their full cost, and because of this the Cleveland Cliffs Co. guarantees both the principal and the interest of the issue. The usual custom is to issue steamship bonds for half the constructive cost of the vessel, the other half being supplied in cash by the owners. The hull insurance amply secures the loan, as it is usually written for twice the face of the bonds. In this case, however, the endorsement of the Cleveland Cliffs Iron Co. makes the bonds a gilt-edge security. The bonds mature in from one to fifteen years, at the end of which time it is expected that their earnings will have repaid principal and interest and more.

FAST COAL UNLOADING.

On May 29 and 30 some remarkably fast coal unloading was done by the No. 2 machine at the Rondeau dock of the Lake Erie Coal Co., Ltd. This machine in 7 hours and 24 minutes actual working time discharged from the Marquette & Bessemer No. 1 boat a cargo of 1,653 tons of lump coal, an average of 223½ tons per hour including cleaning up; about half of the cargo was unloaded into cars and the balance on stock piles. The No. 2 machine above referred to was installed by the Wellman-Seaver-Morgan Co., Cleveland, O., and is fitted with a Hulett patent excavating bucket of 5-tons capacity.

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SCIENTIFIC LAKE NAVIGATION.

By Clarence E. Long.

Reduction of Minutes of Arc and Time.

(DECIMAL REDUCTION.)

To Reduce Minutes of Arc to a Decimal of a Degree.

Rule.—Divide the number of ′ given by 60, and point off as in division of decimals, and the quotient thus obtained will be the decimal of a degree, which place to the right of the degrees, if any, and will constitute degrees and the decimals of a degree.

Example: Reduce 45′ to the decimal of a degree. 45′ ÷ 60 = .75, which is the decimal of a degree.

60) 45.00′ (.75°
420
300
300

To convert the decimal of a ° into ′ multiply the decimal by 6; thus, .75° × 60 = 45.00′.

How much is 11.25° equal to in degrees and minutes. Ans. 11° 15′; multiply the decimal part of the degree by 60 gives minutes (.25° × 60 = 15′).

To Reduce Minutes of Time into the Decimal of an Hour.

The rule is precisely the same as that of reducing minutes of arc to the decimal of a degree.

Convert 38 minutes into the decimal of an hour. This would be 38-60. Add a cipher, or ciphers, to the numerator and divide by the denominator; thus,

60) 38.00 (.63 of an hour.
360
200
180
20

Convert 3 hrs. 48 mins. into the decimal of an hour.

60) 48.0 (.8h = 3.8 hrs.
480

To convert the decimal of an hour into minutes, multiply by 60; thus, .8h. x 60 = 48.0 m.

To reduce minutes and seconds of arc into the decimal of a degree.

Rule.—Divide the number of ″ given by 60, pointing off according to the rule for division of decimals, and the quotient thus obtained will be the decimal of ′. Place this decimal to the right of the ′, if any, with a period, or decimal point, between and divide the number thus formed by 60, pointing off as before indicated. The number thus obtained will be the decimal of a °, which place at the right of the °, if any. The number thus formed will be ° and decimal of a °.

Example: Convert 5° 30′ 36″ into ° and decimal of a °. 36″ ÷ 60 = .6′, which placed at right of the 30′ given equals 30.6′

60) 36.0″ (.6 = .6′
360

30.6′ ÷ 60 = .51 = .51°, which placed at the right of the 5° given equals 5.51°.

60) 30.60′ (.51°
300
60
60

To reduce the decimal of a degree to minutes and seconds of arc, multiply the decimal by 60 and point off, and that which is to the left of the decimal point will represent minutes of arc, and that to the right of the decimal point will represent the decimal part of a minute, and by multiplying this by 60 will give the seconds of arc; thus,

.51° × 60 = 30.60′ and .60′ × 60 = 36.00″, or 30′ 36″.

To reduce minutes and seconds of time to the decimal of an hour.

Rule.—Add a cipher, or ciphers, to the seconds and divide by 60 twice as above.

Convert into decimals of an hour, 2h. 30m. 45s. = 2.5125 hours. 45s. is .75m., and this placed to the right of 30m. makes 30.75m. Dividing 30.75m. by 60 = .5125 hrs.

To get .5125 hrs. into minutes and seconds multiply by 60 twice, as previously done.

To reduce seconds of arc to the decimal of a degree.

Rule.—Divide the number of ″ given by 60, and point off as in division of decimals; then divide the quotient thus obtained by 60, pointing off as before indicated, and the quotient thus obtained will be the decimal of a °.

Reduce 39″ to the decimal of a °.

39″ ÷ 60 = .65′ ÷ 60 = .01083°

60) 39.00″ (65, which is the decimal of a ′
360
300
300

60) .65000′ (.01083, which is the decimal of a °
60
500
480
200
180
20

Ans. .01083°, nearly.

Convert 50 sec. into the decimal of an hour.

60) 50.00″ (.83+ mins.
480
200
180
20

60) .8300′ (.0138+ hrs.
60
230
180
500
480
20

Convert 30 sec. to the decimal of an hour.

60) 30.0s (.5 of a minute.
300

60) .5000m (.0083+ of an hour.
480
200
180

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20

Proof:—

.0083
× 60

.4980
+ 20

.5000, or .5 of a minute.

If a boat steams 10¾ (10.75) miles per hour, how far does she run in 18 mins. 30 secs.? Ans. 3.3 miles.

Explanation.—If she steams 10.75 miles in one hour, it will take her as many minutes to steam 1 mile as 10.75 are contained in 60 min., or 1 hour. 10.75) 60.000

5.58+minutes.

And in 18m. 30 sec., or 18.5 min. she will run as many miles as 5.58 min., the time it takes her to make one mile, are contained times in 18.5, thus,

5.58) 18.500

3.3 or 3.3 miles.

A vessel steams 1.5 (1½) miles in 8¼ (8.25), or 8m. 15s. How fast is she running per hour, and how long does it take her to make a mile? Ans. 5.5 mins. to make 1 mile, and is running 10.9 miles per hour.

If she runs 1.5 miles in 8.25 mins., it will take her as many minutes to make 1 mile as 1.5 are contained times in 8.25 minutes; or, 5.5 times, or 5.5 mins. to make 1 mile; therefore, if it takes 5.5 mins. to make 1 mile, she will make as many miles in 1 hour, or 60 mins., as 5.5 are contained times in 60, or 10.9 times; hence, she is steaming 10.9, or nearly 11 miles, per hour.

If a boat steams 26½ miles in 2 hrs. 8 mins. 30 secs., how fast is she running per hour, and how long does it take her to make one mile?

26½ = 26.5; 8 mins. 30 secs. = 8.5 mins.; 8.5 mins. is .141 of an hour, found thus:

60) 8.500 (.141+
60

250
240

100
60

Therefore, 2h. 8m. 30s. = 2.141 hrs.

hrs. miles.
2.141) 26.50000 (12.37+ miles per hour.
2141

5090
4282

8080
6423

16570
14987

12.37) 60.000 (4.8m. = 4m. 48s.
4948

10520
9896

12.37 miles per hour and 4m. 48s. per mile.

.1 of an hour = 6 mins.; .1 of a ° = 6′
.2 of an hour = 12 mins.; .2 of a ° = 12′
.3 of an hour = 18 mins.; .3 of a ° = 18′
.4 of an hour = 24 mins.; .4 of a ° = 24′
.5 of an hour = 30 mins.; .5 of a ° = 30′
.6 of an hour = 36 mins.; .6 of a ° = 36′
.7 of an hour = 42 mins.; .7 of a ° = 42′
.8 of an hour = 48 mins.; .8 of a ° = 48′
.9 of an hour = 54 mins.; .9 of a ° = 54′

Same for .1 of a minute = 6 seconds; .2 of a minute = 12 seconds, etc., etc.

SPEED TABLE.

Running at various rates of speed the following compilation of figures show the number of minutes and fractions of a minute that it takes to make a mile. This table is given here for the express purpose of assisting the student in proving his work, and it should only be used for that purpose.

Rule.—Divide the number of minutes in an hour (60) by the number of miles per hour, the quotient will be either a whole or mixed number, and represents the number of mins. and fractions, also the decimals, thereof, that it takes the boat to make one mile. To get the number of seconds that the fraction, or decimal, of a minute represents, multiply it by 60 and point off. Thus, 9 into 60 mins. is 6.6 times, or 6 mins. 36 secs.; .6 × 60 = 36.0.

Miles per hour.		Min	Mins and Secs. per mile.
8	=	7.5	or.....7m. 30s.
8¼	=	7.27	or.....7m. 16s.
8½	=	7.05	or.....7m. 3s.
8¾	=	6.85	or.....6m. 51s.
9	=	6.66	or.....6m 36s.
9¼	=	6.48	or.....6m. 29s.
9½	=	6.31	or.....6m. 19s.
9¾	=	6. 1	or.....6m. 6s.
10	=	6.	or.....6m.
10¼	=	5.85	or.....5m. 51s.
10½	=	5.71	or.....5m. 43s.
10¾	=	5.58	or.....5m. 35s.
11	=	5.45	or.....5m. 27s.
11¼	=	5.33	or.....5m. 20s.
11½	=	5.21	or.....5m. 13s.
11¾	=	5.1	or.....5m. 6s.
12	=	5.	or.....5m.

SIMPLE PROPORTION.

This is known by navigators as the "Rule of Three." This lesson should be learned thoroughly since it is one of the most practical methods in mathematics as applied to navigation.

A *simple proportion* is an expression of equality between two simple ratios. It is used to solve problems of which three terms are given, and the fourth is required.

Of the three given numbers, two must always be of the same kind; and the third, of the same kind as the required term.

A *ratio* is the relation between two numbers of the same unit value, expressed by the quotient of the first divided by the second. Thus, the ratio of 12 to 4 is 12 ÷ 4 = 3.

Or, the ratio of one number to another is the quotient obtained by dividing the former by the latter.

Example: If 17 horses cost $4.000, what will be paid for 51 horses at the same rate?

Since the rate is between 51 and 17 is 51-17, or 3. 51 horses will cost 3 times $4.000, or $12,000.

A proportion is an equation in which each number is a ratio. The equality of the two ratios may be indicated by the double colon : : The *sign* of ratio is the colon (:), or the sign of division with the line omitted. Thus, the ratio of 9 to 3 is expressed 9:3, or 9 ÷ 3, or in the form of a fraction 9-3, and is read, the ratio of 9 to 3, or 9 divided by 3. The ratio of 8 to 4 is equal to that of 6 to 3, in the fol-

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lowing way: 8:4::6:3. This proportion is read: the ratio of 8 to 4 is equal to the ratio of 6 to 3, or 8 is to 4 as 6 is to 3.

Since each ratio consists of two terms, every proportion must consist of at least four terms. Each ratio is called a *couplet,* and each term a *proportional.*

The terms of a ratio are the numbers compared. The terms are by name, the first, second, third and fourth. The fourth term is usually the unknown quantity.

The *antecedent* is the first term, or dividend. The antecedents of a proportion are the first and third terms, that is, the antecedents of its ratios.

The *consequent* is the second term, or divisor. The consequents of a proportion are the second and fourth terms, or the consequents of its ratios.

The *extremes* are the first and fourth terms.

The *means* are the second and third terms.

In the proportion 8:4::10:5, 8, 4, 10 and 5 are the proportionals; 8:4 is the first couplet, 10:5 is the second couplet; 8 and 10 are the antecedents, 4 and 5 are the consequents; 8 and 5 are the extremes, 4 and 10 are the means.

A *statement* is the arrangement of these terms in the form of a proportion. Thus, the ratio of 8 to 4 is equal to that of 6 to 3. It is generally indicated thus:

8:4::6:3, or in full, thus:

8 : 4 :: 6 : x x is always the unknown quantity.

× 4

8) 24 (3 = the unknown quantity, or fourth [term.
24

—

To find the fourth term, or unknown quantity, multiply the second and third terms together, and divide by the first term.

Example: If a vessel sails 49.5 miles in 8 hours, how many miles will she run in 24 hours, supposing her to go at the same rate of speed?

Ans. 148.5 miles.

8h. : 24h : : 49.5m : xm

× 24

1980
990

8) 11880

148.5 miles.

In making the statement, or arranging the terms, the first thing to consider is what name is the answer going to take. Make the term having the same name as the answer the third term. Next consider whether the answer, or fourth term, is going to be greater or less than the third term; if greater, make the greater of the two remaining terms the second term, but, if less, make the smaller of the two terms (first and second) the second term. Thus, in the above example, miles is going to be the name of the answer, so make miles (49.5) the third term; now, is the answer going to be more or less than the third term, that is, if the vessel sails 49.5 miles in 8 hours, will she sail more, or less, miles in 24 hours? She will sail more miles, of course, so we make the greater miles, of course, so we make the greater of these remaining of these remaining terms (24 hrs.) the second term, and the remaining term (8 hrs.) the first term. x is the fourth term. You will notice that each couplet, that is, hours and hours, is together, and the couplet miles and miles is together.

If 96 cords of wood cost $240, what will 40 cords cost? Ans. $100.

96 : 40 :: $240 : x

× 40

96) 9600 (100
96

00

Here 40 cords will cost less than 96 cords, so the smaller of the two remaining terms is made the second term.

If 20 lbs. of sugar cost $1.80, find the cost of 45 lbs. Ans. $4.05, or $4 and 5 cents.

If a railroad train runs 30 miles in 50 min., in what time will it run 260 miles? Ans. 7 hrs. 13 1-3 mins.

If a vessel sails 12 miles in 1 hr. 36 mins., how far at the same rate, will she sail in 15 hours? Ans. 112½ miles.

If your boat runs 3½ miles in 23 minutes, how fast is she running per hour? Ans. 9.13 miles. Operation:

23 mins. : 60 mins. :: 3.5 miles : x miles.

× 60

23) 210.00 (9.13
207

30
23

70
69

1

If it takes your boat 17 hrs. 39 mins. to run from Chicago to Pt. Betsey, a distance of 203 statute miles, how long will it take, at the same rate of speed, to run from Pt. Betsey to Waugoshance, a distance of 97 statute miles? Ans. 8 hrs. 25 mins. 48 secs. Operation:

203 miles : 97 miles :: 17.65 hrs. : x =

× 97

12355
15885

203) 1712.05 (8.43 hrs.
1624 × 60

880 25.80 mins.
812 × 60

685 48.00 secs.
609

76

Here is the example previously given worked by proportion: A boat steams 26.5 miles in 2 hrs. 8 mins., 30 secs., what time is she making per hour?

2 hrs. 8 mins. 30 secs. = 128.5 minutes;

128.5 mins. : 60 mins. :: 26.5 miles : x miles.

60

128.5) 1500.000 (12.37 + miles.
1285

3050
2570

4800
3855

9450
8990

At the time when a man 5 ft. 8 in. in height casts a shadow 4 ft. 6 in. long, what is the height of a tree that casts a shadow 46 ft. 6 in. long? Ans. 58 5 9 ft.

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Note.—A proportion must always have four terms; namely, two antecedents and two consequents. When any three are given, the other may be found. The only difficulty in working proportion is to arrange the terms or figures of the proportion. This is all there is to proportion; when this is learned the remainder of the work is very simple. The working of the example must be reasoned out first, not the answer, but the principle of the example. The terms are called couplets, that is, two each of the terms will be of the same name, that is, feet, miles, hours, horses, dollars, or whatever it might be. Of the three terms always given, and necessary for a proportion, two of the three will always have the same name. These two can always be made the first and second terms. The third term is of the same name as the fourth term. To simplify matters make the statement backwards; make x the same name as the third term; the third and fourth terms will be one couplet, and the first and second terms, being of the same name, form the other couplet. The third term may always be known by it having a different name than the other two, that is, what the terms enumerate, such as miles, hours, feet, etc. The second and third terms are multiplied together and the product divided by the first term gives the fourth term;

Or, it may be stated thus: Of the three given terms, two of the terms will be of the same kind; these two are the first and second terms; which is first, and which is second, depends upon what the answer or fourth term is going to be; that is, if the answer is going to be larger than the third term then the second term will be the larger of the two terms which are of the same kind; but if the answer or fourth term is going to be smaller than the third term then the second term must be the smaller of the two terms which are of the same kind.

Just look through the examples that are worked out in full and see if this is not the fact. This is the easiest and simplest way of learning and understanding proportion.

MAGNETIC BEARING OF RANGES.

Editor (Question Dept.), MARINE REVIEW.—I agree with Mr. Long in taking bearings of ranges and lighthouse in the rivers to verify our compass, but where the magnetic bearing of a range is given it must be taken with a grain of allowance, unless we know the year the bearing was taken. For instance, the Canadian lighthouse book gives the magnetic bearing of the "Corunna" ranges, St. Clair river at Stag island as S. 13° E. (N. 13° W.). The United States lake survey chart for 1903 gives the true bearing (which must be always the same). N. 14° 4′ W. (S. 14° 40′ E.), now, the variation for that year in that locality was 3° 2′ west, allowing 4′ annual increase would make the variation for the present year, 3° 14′ west, which subtracted (being westerly variation) from the true bearing, would leave the correct magnetic bearing of the ranges N. 11° 26′ W. (S. 11° 26′ E.) or N. x W. (S. x E.) near enough, which is a difference of 1° 34′ from the bearing given in the lighthouse book, a little over an ⅛ of a W, a good deal in a long run. Am I correct, which I think I am, for I have tried it by my own compass.

M. BOGGAN, Master, steamer Conemaugh.

ST. MARY'S RIVER RULES.

Editor MARINE REVIEW.—Up to June 1 I have been warning most vessels for violation of the St. Mary's rules, but now I think they have had time enough to get used to them again and I shall report all violations where there is no apparent reason for the breaking of the rules. Up to date I have reported only seven; mostly for violation of the rules against crowding and tows meeting at the Encampment turn. There is a great inclination to crowd the vessel ahead. The rule II. requires vessels to keep ¼ mile apart, but not infrequently I have seen them less than a ship's length apart. Then, too, passing signals are frequently unanswered, particularly when an overtaking vessel signals an overtaken vessel where passing is permissible. Taken by and large, though, there seems to be an inclination to do the right thing, and I do not anticipate much trouble for the season.

LIEUT. C. E. JOHNSTON,
Commanding Revenue Cutter Mackinac.

Every watchman, wheelman, mate and master on the lakes should read Clarence E. Long's article on "Scientific Lake Navigation" now running in the MARINE REVIEW. This series began in the issue of April 5. To anyone sending in his subscription now all the back numbers will be sent to him free—that is to say his subscription will be entered for one full year from the date of receipt and all the back numbers allowed without charge.

THE PATENT SOUNDING MACHINE.

BY CLARENCE E. LONG.

In the article entitled "Shaping the Course," mention was made of the manner of reading the depth gauge or recorder, of the patent sounding machine, by the discoloration on the inside of the glass tube of the recorder. These chemically coated tubes depend upon the action of the salt water where it comes in contact with this preparation. These coated tubes are only affected by salt water, therefore, they cannot be used in fresh water, or even in some parts of the ocean, where the water is not very salt. This device could not be used on the lakes.

There are many depth recording devices on the market for sounding purposes, all of which register, in some manner, the depths descended to. The sounding machine proper consists mainly of the winch, drum, wire, handles and indicator for registering the length of wire run out. The depth recorder or gauge is distinct from this part of the machine, since any of these various recorders may be used with it. The depth recorder is merely attached to the end of the wire, either with or without the lead weight. All of the various depth recorders depend upon the same working law or principle, as already explained.

Many attempts have been made during the last half-century by eminent inventors and others to produce such a thoroughly reliable depth gauge, but until recent years nothing has been invented equal in accuracy to the chemically colored tubes so much in use. These efforts although hitherto unsuccessful have been continuous because of the obvious objections to the use of glass tubes, such as, liability to breakage; climatic conditions affecting the coloring; irregular removal of the color, thus giving a ragged cut, and making the actual reading a matter of approximation only; and most important of all, the cost of renewals, a fresh tube being required for each cast.

Bassnett's atmospheric sounder is an instrument constructed on the principle that the pressure of the water increases as the depth, 33 feet or 5½ fathoms being equal to one atmosphere, or 14.7 pounds per square inch. When sounding, the water will ascend the inner tube, and overflow into the outer glass tube, where it will indicate the depth measured on the scale of fathoms. On being drawn out of the sea the water will remain in the outer tube till liberated by the drain pipe. In this instrument it requires no removal of the glass tube, except through breakage. One objection to this instrument is that it must be kept perfectly perpendicular when drawn from the sea in order that none of the overflow water may escape.

Another glass tube recorder is the Tanner-Blish. This is similar to the chemically coated tubes. The water in ascending the tube shows on a ground glass surface.

Probably the best depth gauge on the market today is the Dobbie. In this gauge the principle of compression of air is used which of course is always the same for the same pressure. This gauge consists of a tapered brass tube in which the water is trapped and retained against the compression of the air in the tube by means of non-return and check valves. This tube is closed at one end, and to the other is fitted a water tight cap which fastens in the same way as a ship's port. The inlet valves are constructed on the principle of the familiar bicycle valve, but of improved form, so that the India rubber sleeves do not get cut by pressure against the inlet holes. A fathom scale is supplied with the apparatus for reading or measuring the amount of water trapped so that the number of fathoms can be read off immediately. This device simply traps the water but does not permit any loss of

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same. When the sinker bottoms and is then hauled in no more water can get into the gauge since the pressure of the water and air on the inside is greater than that on the outside. The angle the gauge makes to the ship while being paid out or hauled in is immaterial. The gauge can be turned or gotten on board in any manner of shape and it makes no difference; only that when the screw cap is removed from the top the sounder must be held perpendicular while the fathom scale is inserted. So far up as it shows wet on the scale is the amount of the sounding.

The work of any of these depth gauges can be easily checked or verified by taking the same sounding with a hand lead. In fact, it is a wise plan to frequently test them in this manner. Another advantage of this device is that the master can practically do the work himself even though another takes the sounding (when he cannot personally superintend the operation, and must navigate his ship by an officer's report of depth), he can lock this sounder on the bridge, and if he insists on seeing the bottom by the arming, when he again unlocks it on the bridge to measure the sounding he has practically taken the cast himself. No amount of mishandling, dropping, twisting, or turning gauge about, will in any way affect the water in the gauge until it is unlocked (that is, when the cap or top of gauge is unscrewed.)

GOOD WORK IN WRECKER FAVORITE.

The steamer Roman of the Pittsburg Steamship Co.'s fleet, which was ashore on Summer Island, was sucessfully released by the wrecker Favorite after the steamer Western Star had pulled on her without avail. As soon as the Favorite reached the stranded boat the wrecker's air compressor was set up on the Roman. Air was pumped into the steamer's punctured tanks and after the water was forced out the Favorite pulled her off without trouble. Air compressors were also used in releasing the new steamer Corey from Gull Island last fall most successfully. Mr. Coulby, president and general manager of the company, is so pleased with the work done by the compressor on wrecking jobs that he is figuring on putting compressors on all the large steamers of his fleet. The success, however, which the Favorite has had in wrecking operations is due largely to its personnel. The machinery aboard the Favorite has been highly developed by Capt. Thomas Johnson, assistant to the president of the Great Lakes Towing Co., and he may be said to have practically invented some of the ingenious appliances aboard the wrecker. The equipment, however, is supplemented by the rare skill of Capt. Alex. Cunning of the Favorite, who has succeeded in getting everything that he has gone after on the lakes and has accomplished it so easily that it doesn't seem to be any trouble at all.

MEAN STAGES OF WATER.

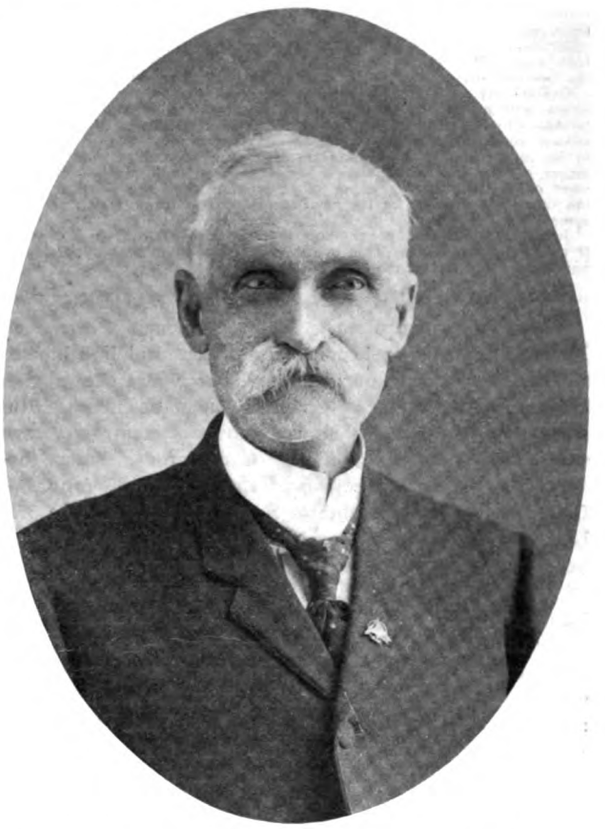
The gauge records of the United States lake survey show the following mean stages of water above mean sea level, for May, 1906:

	Stages during May Feet.	Higher | Lower than during same month last year. Feet | Feet.		Higher | Lower than during May, 1895, Feet. | Feet.	
Lake Superior	602.46		0.03	0.08	
Lake Michigan	581.25	0.28		1.12	
Lake Huron	581 43	0.48		1.31	
Lake Erie	572.39		0.07	0.91	
Lake Ontario	246.51	0.18		1.55	

Present fall Lake Huron to Lake Erie, 0.55 foot more than year ago.

CAPT. T. A. ELLERY.

Capt. T. A. Ellery, Marysville, Mich., the subject of this sketch, was born in Vermont in 1836 and went to Port Huron in 1851. He began sailing in the spring of 1852 at the age of sixteen years, and continued sailing steadily until the fall of 1904, making a career probably unequaled in the history of lake navigation. He began sailing on the topsail schooner, Lady Jane, with Capt. F. Downer. Before the season was



over, Capt. Downer was taken sick and young Ellery took his place as master. Ellery never had any trouble in getting a boat after that, and for over fifty years was continuously master of vessels. He was married July 11, 1851, and his bridal trip was on the schooner Mary Williams, of which he was master at the time. Capt. Ellery expects to have the rare good fortune of celebrating his golden wedding in July of next year.

In 1866 he owned one-half of the brig Preble with Col. Russel A. Alger. At various times he has owned ten boats, including the schooners, Emma, S. L. Noble, W. R. Hannah, tug Preble and one-fourth interest in the steamer J. E. Mills. He sailed this steamer for twenty years and was in employ of M. & B. Mills from 1870 to 1903, thirty-three years. In 1872 he got an unlimited license from Chicago to Montreal as master and pilot. In the winters Capt. Ellery learned ship carpentering and ship joining and rebuilt a great many boats as foreman for M. & B Mills ship yard. He also cut and made many suits of sails and fitted many gangs of hemp rigging. He fitted the first gang to wire rigging that was ever fitted in Port Huron. The figureheads on a number of old-time schooners were the work of Capt. Ellery. He also did all the lettering and graining of the vessels of the Mills Transportation Co. for several years. Lately during his winters he took to house building and has built several for himself and other parties. Though he is seventy years old he has just finished a house and expects to start on another in a few days. Capt. Ellery is really a wonderful old man.

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COALING AT SEA.

(From the Army and Navy Register.)

The decision of the navy department to make a trial of an English method of coaling at sea renews the interest in an important subject and calls attention to the fact that we still have unsolved one of the most pressing problems of modern naval warfare. This question was of vital interest to this country during the Spanish war and

The Cunningham Method of Coaling at Sea by the Use of Water Jets.

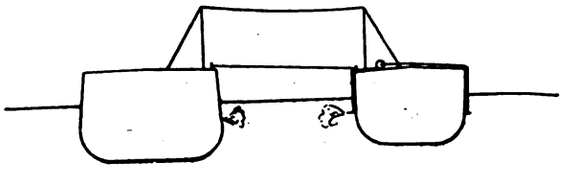

Fig. 1. Warship and collier connected up for coaling. In the warship the water jets are shown as a permanent installation and are operated by the fire or bilge pumps. In the collier the water jets are shown as a temporary or improvised installation, composed of standard centrifugal pumps from commercial stock and ordinary wrought iron pipe led overboard; when the collier is under way the piping is raised up; in the temporary installation the pumps may be located on any deck above the waterline. The water jet installation is only necessary on one ship. The lines which hold the ships at a fixed distance may be connected to a simple hydraulic plunger to relieve the strain of rolling. An extemporized relief may be made with water bags at the center of the lines. If the lines are led up through shocks near the waterline of the ship the strain of rolling will be relieved, the connection being nearer the point of vertical motion. The conveying apparatus is shown rigged on shear legs with sufficient slack to accommodate all rolling motion.

it is to be hoped that a successful solution may be reached before we are again called upon to meet a force that may be more able to choose its point of operations than was the Spaniard.

The Russian-Japanese war has thrown no light upon this question, whatever else it may have taught us. Immense amounts of coal were burned during that war, and with the close blockades maintained by the Japanese

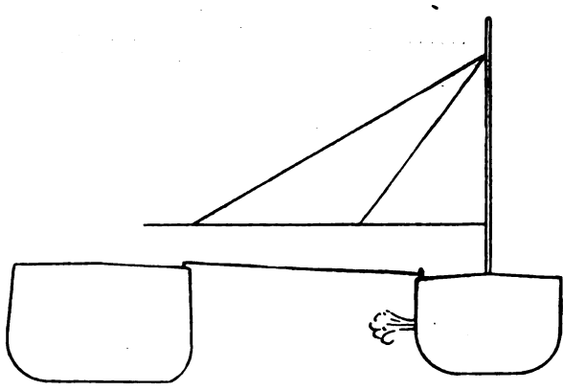

Fig. 2. Warship and collier connected up for coaling. The water jets are shown as a permanent installation in the collier. The conveying apparatus is shown as a boom on the collier, after the manner of Mr. William Seaton, and has no connection to the warship.

much coal must have been transferred at sea—but how? It will presently be seen that coal could have been transferred in large quantities by a method proposed a few years ago by one of our own naval officers, and no trace of the operation left for the information of others. One thing we have observed in the Jap, if we have not learned it, and that is his ability to adopt a good thing, no matter who the author, and to keep quiet about it as well.

The transferrence of coal is not the only thing of importance in this connection. The transferrence of ammunition and stores, provisions, and even men are all within the necessities of modern war, and the navy that is well fitted for these operations may become the victor over a much stronger force which is but ill prepared for these operations. When one examines Zimmer's recent exhaustive book on modern methods of conveying material, and especially the chapter of transferring coal at sea, one is forcibly struck by the meagerness of the latter methods, of which in general principle but two have been proposed.

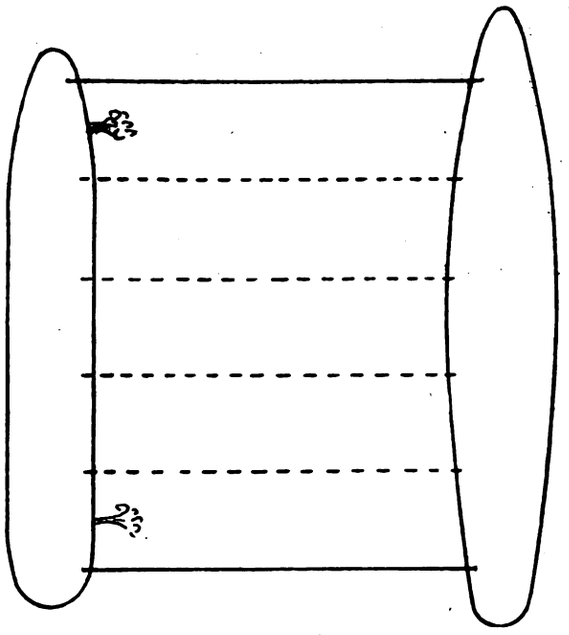

Fig. 3.—Plan showing warship and collier connected up for coaling and four conveyor lines rigged. The connection is made in the following manner: One ship goes ahead under steerage way; the other ship approaches in the same direction in a parallel line within heaving-line distance; the jets are turned on as soon as the lines are passed, and the headway is stopped; the ships are then warped together to the desired distance, varying from 10 feet to 100 feet, according to sea and weather. If the sea is very rough the ships are kept head to sea; if the sea is light the ships are kept in the trough, the slow lateral movement creating a lee and permitting the ships to lay closer together. The coaling being completed, the lines are cast off, the jets kept in operation, one ship goes ahead and the other astern until they are clear. Under ordinary conditions it is estimated that coal can be transferred faster than it can be stored.

The method first tried and which many are still trying to make operative, is coaling in tow. This is the seaman's method and is as illogical as coaling a ship at a dock bow on or passing coal into the tender of a locomotive over the headlight. It is the natural result of the

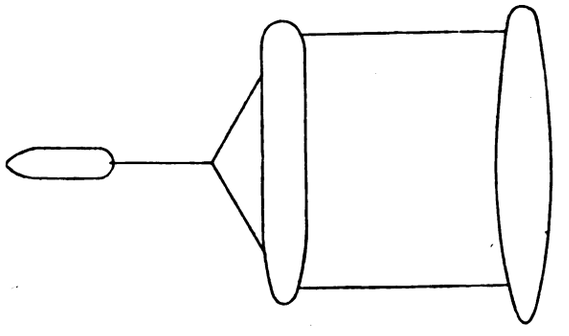

Fig. 4. Coaling with a side tow substituted for the water jets. The side tow is first established, then the other ship approaches and the lines are passed. This is best accomplished in the trough of sea with the side tow to the lee of the ships.

seaman's education which teaches him to recognize but two controllable motions in a ship, ahead and astern. The vital factor in this operation of coaling in tow is a towline, and if this parts the entire incidental apparatus is wrecked. The longer the towline the less liable it is to part and the more difficult and slow becomes the transferrence of the coal, whether by an endless belt or a back and forth trolley. The shorter the towline the easier the transferrence and the surer the parting of the towline as

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the sea becomes heavier. There have been many trials of coaling in tow and more or less vague reports of its success or non-success, but the significant fact remains that no one who has given these methods a trial has made any general adoption of them.

The logical and common-sense way to transfer coal at sea is broadside on, the same as at a dock. We tried it in the Spanish war and mashed in the plates of some of our colliers, but the principle remains as correct as the application was wrong. When we coal at a dock we hold the ship off with spur shores or fenders—when we try to hold two ships apart in the most moderate sea way with spur shores or fenders we mash something up.

It is within the recollection of some of us, whose hair is not too dark, when the seaman had a great contempt

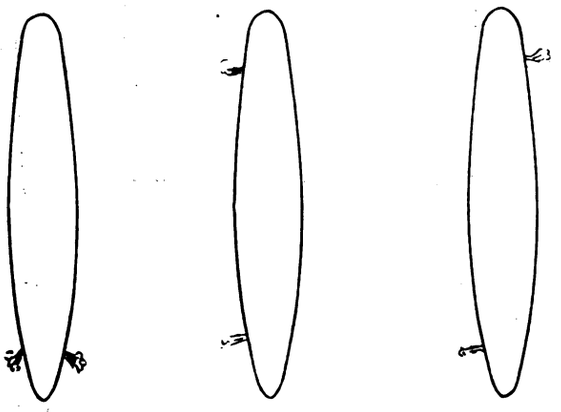

Fig. 5. Uses of water jets in turning, getting away from a dock without a tug and in checking headway or going astern when the jets are installed at an angle.

for steam; to go ahead, back, or turn, by the ringing of a bell was unsportsmanlike and too easy. How much more truly nautical to haul the main yard, clew up, haul down, haul anything, cut away the foremast and fire when you bear, sir! Of course, all that is past now and we have new rules of sport, but the seaman still likes to go sideways, except when making leeway which he can not control.

Civil Engineer A. C. Cunningham, of the navy, has proposed to move sideways in coaling ships at sea, and his method is the second and last one mentioned by Zimmer in the work before referred to. Zimmer remarks that if Cunningham's pumps fail his method will be inoperative, and in this respect we believe that Zimmer is correct.

The Cunningham method is illustrated in the accompanying cuts. It seems to recognize that ships at sea have more or less motion and that rigid connections between them will not do. For the spur shores or fenders used alongside a dock he substitutes water jets. It seems to be purely a question of the necessary power of the jets and whether a seaman can lay one ship near enough to another to pass a line without having a collision. There seems to be more in this sideways motion which Mr. Cunningham has proposed than mere use in coaling. It looks as if ships on blockade could maintain direction without change of position and that getting away from a crowded dock would be made much easier; steering with but little headway on appears to be possible, as when entering a dry dock, and perhaps some other uses which we do not see.

The temporary installation of this method seems so simple and easy that we wonder it has not had a trial, for even if the trial condemned it, the way might be indicated to a satisfactory solution of this problem. The simplest trial that could be made would be with a tug towing the collier sideways, and this is the method that we suggested on the start as possibly having been used by the Japanese, who had an abundance of destroyers that could be used for the purpose.

If ships can be kept apart by water jets, any of the existing methods of transferring coal can be used in a much simplified form and in several places at once, and in ordinary weather it would seem as if the coal could be passed with ordinary whips. Concerning the water jet principle, we do know that hydraulic dredges have moved and steered themselves over long distances by simply putting their suction pipes overboard and starting the pump.

SUMMARY OF NAVAL CONSTRUCTION.

In the following summary of naval construction, issued by the navy department, the battleship Louisiana, built by the Newport News Ship Building & Dry Dock Co., is given as 100 per cent completed, thus acknowledging the supremacy of the private yard in the construction test with the Brooklyn navy yard. The summary shows the customary progress upon all the vessels.

BATTLESHIPS.

Name of Vessel	Building at	1908 % of Completion May 1.	June 1.
Virginia	Newport News S. B. Co.	99.9	99.95
Nebraska	Moran Bros. Co.	92.65	94.
Georgia	Bath Iron Works	96.58	96.70
New Jersey	Fore River S. B. Co.	99.5	100.
Connecticut	Navy Yard, New York	97.41	97.41
Louisiana	Newport News S. B. Co.	98.98	100.
Vermont	Fore River S. B. Co.	83.8	85.
Kansas	New York S. B. Co.	78.5	82.2
Minnesota	Newport News S. B. Co.	88.28	89.76
Mississippi	Wm. Cramp & Sons	54.88	57.67
Idaho	Wm. Cramp & Sons	53.52	55.73
New Hampshire	New York S. B. Co.	42.5	45.7

ARMORED CRUISERS.

California	Union Iron Works	92.8	93.3
South Dakota	Union Iron Works	90.4	91.1
Tennessee	Wm. Cramp & Sons	97.51	98.97
Washington	New York S. B. Co.	97.3	98.2
North Carolina	Newport News S. B. Co.	42.73	46.35
Montana	Newport News S. B. Co.	38.24	41.32

PROTECTED CRUISERS.

St. Louis	Neafie & Levy S. & E. B. Co	95.66	96.78
Milwaukee	Union Iron Works	94.3	95.2

TRAINING SHIPS.

Cumberland	Navy Yard, Boston	95.	95.
Intrepid	Navy Yard, Mare Island	97.5	97.5

SCOUT CRUISERS.

Chester	Bath Iron Works	29.44	32.34
Birmingham	Fore River S. B. Co.	31.3	34.7
Salem	Fore River S. B. Co.	32.2	35.7

SUBMARINE TORPEDO BOATS.

Submarine T. B. No. 9,	Fore River S. B. Co.	68.2	72.5
Submarine T. B. No. 10,	Fore River S. B. Co.	53.5	57.6
Submarine T. B. No. 11,	Fore River S. B. Co.	60.5	64.1
Submarine T. B. No. 12,	Fore River S. B. Co.	53.8	56.9

NEW STEAMER FOR CHESAPEAKE STEAMSHIP CO.

The Chesapeake Steamship Co. has accepted the estimate of the New York Shipbuilding Co. for the construction of a new steel passenger and freight propeller steamer to be operated on the Chesapeake line between Baltimore and Norfolk, touching in each direction at Old Point Comfort. The new steamer will be similar in construction to the Augusta and her dimensions will be 285 ft. in length, 46 ft. beam and 17 ft. 4 in. in depth. The contract calls for speed of 19 miles per hour. The

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steamer will be equipped with a four-cylinder, triple-expansion engine of the most modern design; the power will be furnished by four Scotch boilers 13 ft. 9 in. in diameter and 12 ft. in length. The stateroom capacity of this steamer will be double that of her sister ship, the Augusta.

Every stateroom will be an outside room and will be fitted with electric call bells and steam radiators. There will also be running water in all the staterooms. The dining room and saloons will be finished in solid mahogany, and the smoking room will be finished in select hardwood with hardwood flooring; the seats of the smoking room will be upholstered in leather. The dining room will be located on the main passenger deck forward, right in the bow of the ship, so as to insure a free circulation of light and sea air while the passengers are enjoying the elegant meals for which this line has been so long justly famous.

The ship will be lighted with electricity throughout, and will have a powerful searchlight as well as electric running lights.

The steamer will be furnished with steam steering gear of the most modern pattern, and will be equipped with auxiliary hand steering gear.

No expense will be spared to make this steamer the peer of any vessel on the Chesapeake bay, and the contract calls for her to be rated Star A-1 for twenty years by the American Bureau of Shipping; this is the highest rating given to any steamer plying on the Atlantic coast or tributaries. The contract with the builders calls for the delivery of this steamer within ten months, so as to insure her being placed in commission before the opening of the Jamestown Exposition in 1907.

The Chesapeake Steamship Co.'s passenger and freight traffic has increased so greatly within the past few years that their present fleet of steamers, namely, Augusta, Atlanta, Baltimore, Charlotte and Danville, has been hardly able to handle their business, not only from Baltimore to the south, but also from the south to Baltimore, which includes a large proportion of Baltimore's export freight, such as tobacco, cotton, etc., originating in the south. This company's increase of passenger traffic has been greater than the increase of freight traffic, therefore the passenger accommodations on the new ship will be arranged to provide comfortable quarters for fifty per cent more people than can be accommodated on the sister ships.

It is expected that the new ship will relieve the palace steamer Atlanta on the Chesapeake line early next spring before the opening of the Jamestown Exposition, and the Atlanta will be placed on the Chesapeake Steamship Co.'s York River line, the famous route between Baltimore, Yorktown, West Point and Richmond in order to relieve the heavy traffic on that line.

OBITUARY.

Capt. P. McFarlane, a well-known lake master, died at his home in Buffalo last week. His last command was the Mauch Chunk of the Lehigh Valley line.

ITEMS OF GENERAL INTEREST.

The dry dock Dewey has arrived safely at Colombo, Ceylon.

British tonnage through the Suez canal last year decreased 476,988 tons, as compared with 1904, while German tonnage increased 143,923 tons.

The MARINE REVIEW has an inquiry for a charter to load at Philadelphia for the Pacific coast. Does any vessel owner desire to divert a steamer to that trade?

Ship building along the Delaware is quite active at present. There are under construction at the different yards on this river, six naval vessels, forty-one merchant vessels, three steel dredges and eight large car floats.

The Sharpley Marine Railways, Greenbackville, Va., report that they have more work on hand at present than they can get workmen to do. The work consists of building and fitting out gasoline launches ranging from 1½ H. P. to 35 H. P., including a varied class of boats such as oyster, fish, pleasure and coastwise vessels.

The steamer La Provence on her second eastward trip completed the passage in six days, two hours and 48 minutes. The Deutschland, of the Hamburg-American line, left New York simultaneously with La Provence, but was outstripped by four hours and 20 minutes in reaching the Sicily Islands, though it is understood that the Deutschland took a more southerly and, therefore, much longer course. Mr. John D. Rockefeller was a passenger aboard La Provence.

Careful examination of the steamship Columbia shows that the damage sustained by that vessel falling through the Union Iron Works dry dock on account of the great shock of April 18 will reach not less than $90,000. Besides the many big holes punched through the steel hull, her cabins were totally wrecked, and will have to be torn away and rebuilt. It will be months before the big steamer can be placed in active commission again. The dry dock belonging to the Union Iron Works was also practically ruined by the shock, and will have to be rebuilt at heavy expense.

Rear Admiral B. H. McCalla, U. S. N., will retain his post as commandant of the Mare Island navy yard four months longer than he expected and until his successor, Capt. Benjamin F. Tilley, former captain of the yard at Mare Island, and at present commanding the United States battleship Iowa, shall be appointed and be ready to assume that post. Admiral McCalla was retired and his time expired June 6, 1906. It is well known on Mare Island that Admiral McCalla has applied to the navy department to be retained on the active list for two years after his age for retirement. It is not known definitely whether he will be granted this request from the department or not.

Another ferry boat is very soon to be built by the Key Route Co. at San Francisco that will take the place of the new and unfinished craft very recently destroyed by fire while lying at the Union Iron Works receiving the machinery. Some haste will be exercised in constructing the new boat, which will be both staunch and fast—an exact duplicate of the company's steamer San Francisco. Another new boat of the company is now on the ways and will soon be launched. At the time of the great earthquake, this vessel was knocked clear from off the blocking and thrown over on her side. To get the keel-frame back again into position has both caused delay and lost money for the Key Route Co.

The Great Northern Railroad Co. has recently signed a ten-years' contract with the Nippon-Yusen Kaisha, which provides for an exchange of traffic and the representation of the Hill road and steamship lines in oriental ports by the Japanese company. In this country the Great Northern will represent the Nippon-Yusen Kaisha. The Great Northern under the new deal is given the privilege of additional independent representation in the Orient. J. S. Van Buren, the newly appointed general agent in the Orient, with headquarters at Hong Kong, will be instructed by mail to name a general agent in Japan and strengthen the traffic representation elsewhere. The sailings of the Nippon-Yusen Kaisha fleet, newly arranged on a fortnightly basis, will be regulated so as not to interfere with the sailing dates of the Hill liners—Dakota and Minnesota.

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TRADE NOTES.

The American Dredging Co. is installing a generating set for marine service upon its dredge New Jersey, furnished by the B. F. Sturtevant Co., Boston, Mass.

The total boilers equipped to date with the Williams Safety feed water regulators will aggregate 4,000,000 H. P. The regulators are manufactured at their shops in Pittsburg, Pa.

The Independent Pneumatic Tool Co., Chicago, will have a complete exhibition of Thor pneumatic tools and appliances at the Railroad Master Mechanics and Master Carbuilders' convention at Atlantic City, July 13 to July 20.

The Williams Gauge Co., Pittsburg, Pa., have opened an office at Montreal, which will be conducted by Mr. Wm. M. Courtenay. This is the third office in the Dominion of Canada now operated by this company, who have found it necessary to handle the business which has been coming to them from that country.

The scout ships Chester, Birmingham and Salem, building for the United States navy, are to be fitted with the See hydro-pneumatic ash ejectors, manufactured by Horace See, 1 Broadway, New York. This ejecter is also being installed upon about 100 foreign ships, both naval and merchant marine.

The Standard Cordage Co., 82-92 Beaver street, New York (formerly owned by the Standard Rope & Twine Co.), has resumed operations. The Sewell & Day Mills (the Standard's big plant in Boston), and the Waterbury Mills, located in Brooklyn, are now running. Mr. Charles Wilson, president, and Mr. Edward C. Butler, vice president, for many years connected with the Fitler Cordage Co. of Philadelphia are in charge of the business.

The Standard Oil Co. has ordered two "Hornsby-Akroyd" oil engines of 25 H. P. each, which will be shipped to Chinkiang, China, and used for pumping purposes. These engines are supplied by the De La Vergne Machine Co., foot of East 138th street, New York, who state that the use of oil engines has increased enormously in the past few years, there being now over 14,000 oil engines of the "Hornsby-Akroyd" make alone in operation.

The Falls Hollow Staybolt Co., Cuyahoga Falls, O., are in receipt of an order for two car loads of Falls Hollow staybolt iron bars to be shipped to the Mitsu Bishi Dockyard & Engine Works, Japan; also for several tons of double refined charcoal iron hollow bars from their Berlin representative to be consigned to the Prussian State Railway Department. These orders prove that Falls hollow iron is much approved of by the foreign railways, as the company is now shipping the material regularly to Australia, New Zealand, Norway, Prussia, Germany, Japan, China, Korea, Brazil, Peru, Cuba, Porto Rico and other foreign countries.

"Shipmates" is the very attractive title of a catalog just issued by the Stamford Foundry Co., Stamford, Conn., describing Shipmate ranges. These ranges are in every way suited to the peculiar and exacting requirements of vessel work. They are well made and durable and are warranted to work perfectly. The ranges are made for very hard use and are built to stand it. The catalog describes the ranges thoroughly and gives a list of vessels that are using them. The catalog is, moreover, illustrated with some extremely beautiful photographs of the vessels upon which Shipmate ranges are installed. The list includes schooners, yachts, fishing tugs, freighters, passenger boats, gunboats, dredges and a variety of other craft. In fact, the REVIEW has never seen a better collection of photographs of vessels than that which is used in illustrating the catalog of the Stamford Foundry Co. and it is certainly a fine endorsement of the Shipmate range that it should be installed on all these vessels.

The use of feed water regulators in power plant practice is becoming the rule instead of the exception, and engineers are beginning to appreciate their value as economy and efficiency producers. In fact the modern plant would be as much at sea without a Safety feed water regulator as it would without a pop valve. The Williams Gauge Co., who manufacture the Safety feed water regulator, announce a few of their sales, together with the horsepower below: Illinois Central Railroad, 1,200 H. P.; Delaware, Lackawanna & Western Railroad, 25,000 H. P.; Republic Iron & Steel Co., 15,000 H. P.; Tenn. Coal, Iron & R. R. Co., 10,000 H. P.; Penna. Coal Co., 7,000 H. P.; Amer. Car & Fdry. Co., 9,000 H. P.; Morgan Engineering Co., 2,000 H. P.; Westinghouse Electric & Mfg. Co., 2,000 H. P.; New York Central & Hudson River R. R., 3,000 H. P.; Pullman Palace Car Co., 2,000 H. P.; Illinois Steel Co., 4,000 H. P.; Carnegie Steel Co., 3,000 H. P.; Crucible Steel Co., 4,000 H. P.; Boston & Maine Railroad, 1,200 H. P.

PERSONAL.

Mr. J. B. Hayward has been appointed assistant inspector of boilers for the Cleveland district.

Mr. A. D. Hatfield, treasurer of the Wellman-Seaver-Morgan Co., of Cleveland, has gone to Europe for a stay of two months.

Capt. John E. Paine, Philadelphia, will on June 5 succeed Mr. Frank J. Firth as president of the Erie & Western Transportation Co.

Mr. John L. Mullin has been appointed auditor of the Pittsburg Steamship Co. and the Oliver Iron Mining Co., to succeed the late W. M. Jeffrey.

Capt. Thomas Gould, of Cleveland, has been appointed assistant local inspector of hulls for the Cleveland district. Capt. Gould is master of the steamer Cambria of the Pittsburg Steamship Co.'s fleet.

Mr. Bruce Ismay, president of the International Mercantile Marine Co., visited Antwerp recently to inquire into the navigability of the Scheldt with a view of constructing a new steamer for the New York service of the Red Star line.

Capt. Henry C. McCallum has been appointed assistant inspector of hulls, and George M. Milne assistant inspector of boilers at Detroit. Capt. McCallum is at present master of the steamer Majestic and Mr. Milne is chief engineer of the steamer L. C. Smith, of the United States Transportation Co.'s fleet. Capt. Robert Reid of Saugatuck has been appointed assistant inspector of hulls at Chicago. Wm. Nicholas has been appointed assistant inspector of boilers at Chicago.

Mr. Wm. Clegg Jr., who has been special agent of the Westinghouse Electric & Mfg. Co., in their St. Louis territory, has just received the appointment of acting manager of the St. Louis office. Mr. D. E. Webster, formerly manager of the office, has been transferred to a position in the Chicago sales office of the company. Mr. J. S. Tritle has been appointed acting manager of the new district office opened by the Westinghouse Electric & Mfg. Co., in rooms 512 and 513, New England building, Kansas City, Mo. Mr. Tritle was formerly connected with the St. Louis office of the Westinghouse Electric & Mfg. Co.

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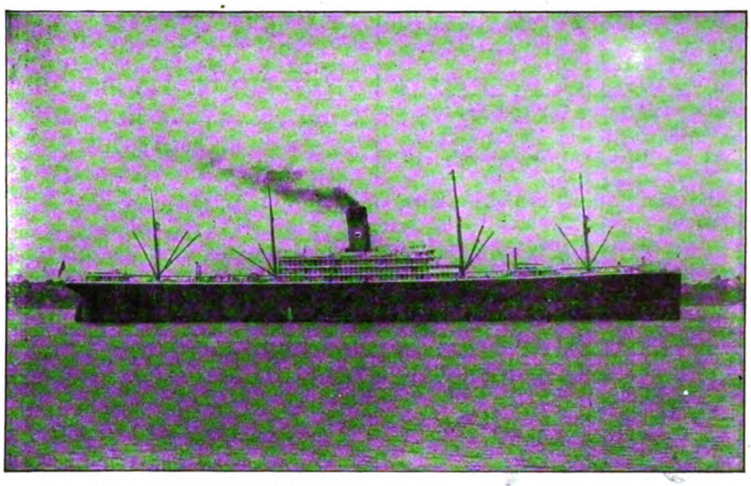
Hyde Windlasses and Capstans



Steamship Minnesota equipped with Hyde Windlass and Capstans.

Selected for the Minnesota and Dakota of the Great Northern Steamship Co.'s fleet—the largest vessels ever built in the United States. They are also being installed on nearly all of the vessels now building for the Navy Department, Revenue Cutter service, Lighthouse Board and the United States Coast Survey.

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WANTED and FOR SALE Department.

PROPOSALS.

U. S. Engineer Office, Jones Building, Detroit, Mich., June 4, 1906. Sealed proposals for widening St. Marys' Falls Canal will be received at this office until 2 p. m., July 24, 1906, and then publicly opened. Information furnished on application. Chas. E. L. B. Davis, Col. Engrs.

U. S. Engineer Office, Room 508, Federal Bldg., Chicago, Ill., May 26, 1906. Sealed proposals for concrete superstructure in Chicago Harbor, Ill., will be received here until noon, June 30, 1906, and then publicly opened. Information on application. W. H BIXBY, Lt. Col., Engrs.

U. S. Engineer Office, Milwaukee, Wis., June 1, 1906. Sealed proposals for building crib extensions of 100 feet each to breakwaters at Sheboygan and Kenosha Harbors, Wisconsin, will be received here until 3 P. M., standard time, June 27, 1906, and then publicly opened. Information furnished on application. W. V. Judson, Major, Engrs.

U. S. Engineer Office, Jones Building, Detroit, Mich., June 11, 1906. Sealed proposals for dredging Shoal 28 in Mud Lake, St. Mary's River, Mich., will be received at this office until 2 p. m. July 11, 1906, and then publicly opened. Information furnished on application. Chas. E. L. B. Davis, Col. Engineers.

FOR SALE.

Six Scotch Boilers 14 x 12 ft. 3 Furnaces allowed 160 lbs. Steam last Inspection; for particulars and price address Geo. W. Pfohl, No. 30 Ohio St., Buffalo, N. Y.

FOR SALE.

Diving Suit.

FOR SALE.—Diving Suit, Pump and complete outfit, used but once, good as new; a bargain. E. L. Strong, 112 Superior St., Cleveland, O.

For Sale or Charter for the Season.

Commodious Steam Yacht, 75 ft. long, 18 ft. beam, 6½ depth of hold. Two staterooms and finest outfit, including electric light plant, search light, and power launch. Triple expansion engine, safety boiler. Cheap and easy steamer. Inquire of R. J. Cram, Port Huron, Mich.

For Sale.

1,000 h. p. fore and aft Neafie & Levy compound Engine; surface condenser; independent pumps.
Two 12-foot Scotch Boilers.
One 13½-foot Scotch Boiler.
One 10 16-25 x 16 triple expansion Engine.
Three 150-h. p. Almy Boilers.
One 200-h. p. Tregurtha Boiler.
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One Williamson steering Engine.
One 10 k. w. electric lighting Set.
One 15 k. w. electric lighting Set.
One Providence Windlass, 50 fathoms 1½ in. chain.
Two thrust Shafts and Bearings, 8½ in. diameter.

MARVIN BRIGGS,
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FOR SALE.

For Sale.

Scotch Marine Boiler 6 x 8 feet and two 11 x 12 Marine Engines complete. Good bargain. AMERICAN CRUSHED STONE COMPANY, Chicago, Ill.

A Bargain.

Steamer E. F. Gould, length 137 ft., width 28 ft, depth 8 ft. 5 in, tonnage 261 tons. Boiler, engine and hull in good condition. First-class, complete sand pumping outfit now installed on boat, will sell with boat if so desired. Apply
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Five Scotch Boilers, allowed 160 lbs. steam. Good as new. ERIE MACHINERY CO., 729 Garfield Bldg., Cleveland, O.

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3 to 3½ yard rock dredge dipper. Give price and particulars. Box 101, the MARINE REVIEW.

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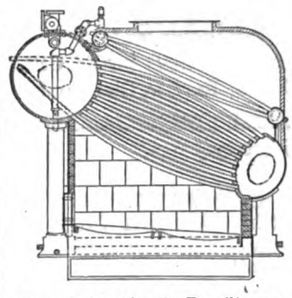
THE MOSHER PATENT WATERTUBE BOILER



Simplest, lightest most compact boiler made. Most accessible for cleaning and repair. Five vertical rows or as many as 45 tubes may be cleaned or withdrawn by removing the cover from a single hand hole. Largest grate surface on a given floor space. No joints in the fire. All joints expanded. Greater steam room and water capacity than any other boiler. Built in sizes up to 2000 H. P. Mosher Boilers have been supplied for eleven torpedo boats and the monitor Florida of the U. S. Navy, amounting to over 26,000 H. P., six torpedo boats for the Russian Navy two gun boats for the Mexican government, one cruiser and one torpedo boat for the Brazilian government; the steam yachts Arrow, Elide, Feiseen, Wauneta, Presto, and numerous other yachts and vessels.

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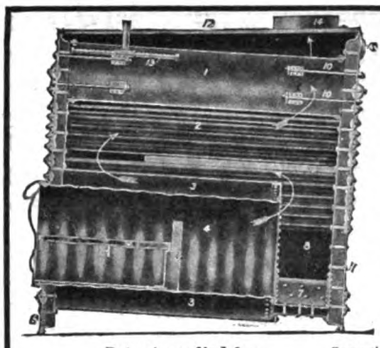

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Internally Fired.

Scotch and Water Tube types combined, eliminating all objections.

Half the weight of ordinary Scotch boilers.

Standard corrugated furnaces.

Patent applied for. Investigate before buying any other.

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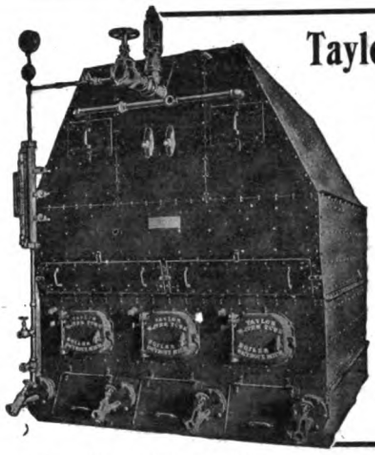

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Vertical Tubes, sectional, large steam space and liberating area.
Fire box, combustion chamber, and course for the furnace gases similar to the Scotch Marine.
Free circulation type.

Send for full description.

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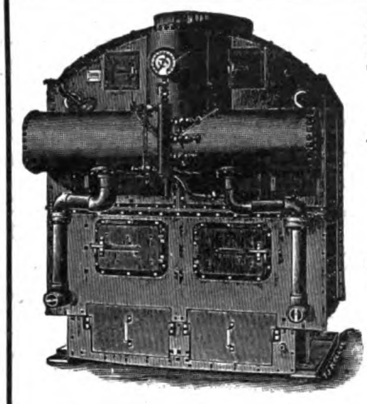

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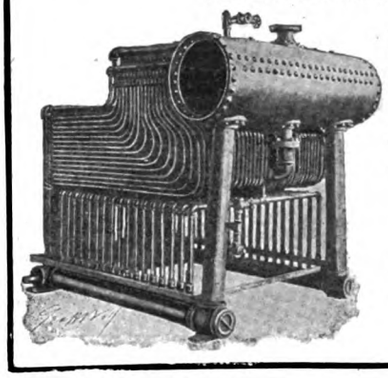

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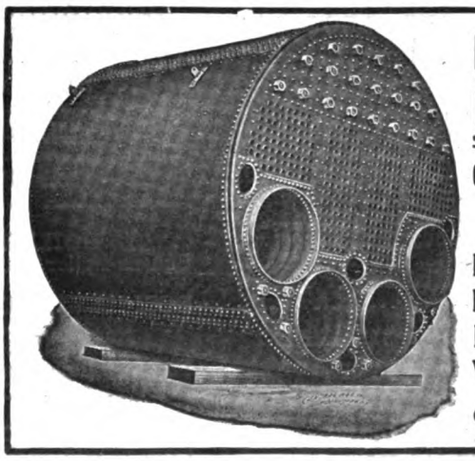

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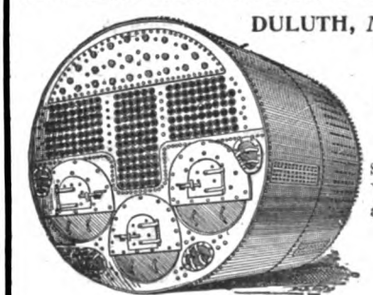

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[See accompanying Index of Advertisers for full addresses of concerns in this Directory.]

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The Bird-Archer Co.....New York
Dearborn Drug & Chemical Works.....Chicago.
State Manufacturing Co...Cleveland.

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Almy Water Tube Boiler Co.....Providence, R. I.

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Chicago Ship Building Co..Chicago.
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Detroit Ship Building Co....Detroit.
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Quintard Iron Works Co.....New York.
Roberts Safety Water Tube Boiler Co. .....New York.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co....Detroit.

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Hubbell Co., H. W..Saginaw, Mich.
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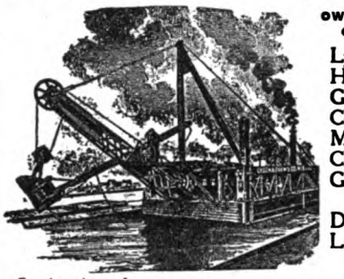

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A REVOLVING CLAMSHELL DREDGE

which will do the following impossibilities to the ordinary dredge:

Excavate 60′ back from face of dock into scow or vice versa. Excavate at either end of itself and dump in scow at other end. This makes through cutting and cleaning narrow slips cheaply possible. Excavate trenches to 150′ or more depth. Excavate material and throw it one side 150′ from original site where there is four feet of water between dump and channel. Excavate shallow channels down to 4′ x 44′. Clean out boulders or obstructions without disturbing surrounding bottom Excavate close to docks without injury to dock. Anything that ordinary derrick will do up to 10 tons at 75′ radius.

This is an excellent wrecking tool.

Hickler Brothers

SAULT STE. MARIE, MICH.

MARINE RAILWAY

Capacity, 1,000 tons. Draft, 7½ ft. forward, 13½ ft. aft. Length on keel blocks, 180 ft.; over all, 190 ft.

Machine Shop, Foundry and Steam Forge, Dredges, Drill Boats and Derrick Scows.

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.

Lighter Carrying Different Grades at all Times.

Fuel Scow with elevators and discharging spouts. Storage of 800 tons. Discharges 250 tons an hour into steamers while unloading cargo.

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of all kinds

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Brown-Hoisting Machinery Co.....
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Dunbar & Sullivan Dredging Co....
.... Buffalo.
Great Lakes Dredge & Dock Co..
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Hickler Bros. .....
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Atlantic Works ..East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....
.... Chicago
Cramp, Wm. & Sons..Philadelphia.
Detroit Ship Building Co.....
.... Detroit
Great Lakes Engineering Works....
.... Detroit.
Lockwood Mfg. Co.....
.....East Boston, Mass.
Milwaukee Dry Dock Co.....
....Milwaukee.
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.....Newport News, Va.
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General Electric Co.....
.....Schenectady, N. Y.
Thropp & Sons, John E.....
.....Trenton, N. J.

ENGINE BUILDERS, MARINE.
American Ship Building Co.....
..... Cleveland.
Atlantic Works, East Boston, Mass.
Chicago Ship Building Co., Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons, Philadelphia.
Detroit Ship Building Co., Detroit.
Fletcher, W. & A. Co., Hoboken, N. J.
Fore River Shipbuilding Co.....
..... Quincy, Mass.

ENGINE BUILDERS—Continued.
Great Lakes Engineering Works....
..... Detroit, Mich.
Hall Bros. ..... Philadelphia.
Lockwood Mfg. Co.....
.....East Boston, Mass.
Maryland Steel Co.....
.....Sparrows Point, Md.
Milwaukee Dry Dock Co., Milwaukee.
Mosher, Chas. D.....New York.
Newport News Ship Building Co....
.....Newport News, Va.
New York Ship Building Co.....
.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co. ..... Duluth, Mich.
Quintard Iron Works Co., New York.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....
..... Superior, Wis.
Thropp, J. E. & Sons Co.....
.....Trenton, N. J.
Trout, H. G.....Buffalo.

ENGINE ROOM TELEGRAPH CALL BELLS, ETC.
Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co., New York.

ENGINEERING SPECIALTIES AND SUPPLIES.
Lunkenheimer Co. ..... Cincinnati.
Northwestern Steam Boiler & Mfg. Co. ..... Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.
Hynd, Alexander ..... Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph.....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James ..... Cleveland.
Roelker, H. B.....New York.
Wood, W. J.....Chicago.

FEED WATER PURIFIERS AND HEATERS.
Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.
Ross Valve Co.....Troy, N. Y.
Wheeler Condenser & Engineering Co. ..... New York.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.
General Electric Co.....
.....Schenectady, N. Y.

FORGES.
Sutton Co., C. E.....Toledo, O.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.
Cleveland City Forge & Iron Co....
..... Cleveland.
Fore River Shipbuilding Co.....
..... Quincy, Mass.

FLUE WELDING.
Fix's S. Sons.....Cleveland.

FUELING COMPANIES AND COAL DEALERS.
Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co., Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Pickands, Mather & Co., Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co., Detroit.

FURNACES FOR BOILERS.
Continental Iron Works, New York.

GAS BUOYS.
Safety Car Heating & Lighting Co..
..... New York.

GAS AND GASOLINE ENGINES.
Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.
Lunkenheimer Co. ..... Cincinnati.

GAUGES, WATER.
Lunkenheimer Co.....Cincinnati, O.

GENERATING SETS.
General Electric Co.....
.....Schenectady, N. Y.

GRAPHITE.
Dixon Crucible Co., Joseph.....
.....Jersey City, N. J.

GREASE EXTRACTORS.
Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.

HAMMERS, STEAM.
Chase Machine Co.....Cleveland.

HEATING APPARATUS.
Sutton Co., C. E.....Toledo, O.

HOISTS FOR CARGO, ETC.
American Ship Building Co.....
..... Cleveland.
Brown Hoisting Machinery Co.....
..... Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....
.....Grand Haven, Mich.
General Electric Co.....New York.
Hyde Windlass Co.....Bath, Me.
Marine Iron Co.....Bay City.

HOLLOW STAYBOLT IRON.
Falls Hollow Staybolt Co.....
.....Cuyahoga Falls, O.

HYDRAULIC DREDGES.
Great Lakes Engineering Works....
.... Detroit.

HYDRAULIC TOOLS.
Watson-Stillman Co., The.....
..... New York.

ICE MACHINERY.
Great Lakes Engineering Works....
..... Detroit.
Roelker, H. B.....New York.

INJECTORS.
American Injector Co.....Detroit.
Jenkins Bros.....New York.
Lunkenheimer Co. ..... Cincinnati.
Penberthy Injector Co.....
..... Detroit, Mich.

INSURANCE, MARINE.
Elphicke, C. W. & Co.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A., Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F.....
.....New York and Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

IRON CASTINGS.
Sutton Co., C. E.....Toledo, O.

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